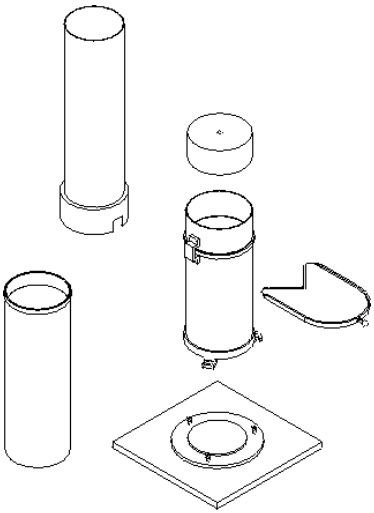
User Manual

User manual no.:
IMMU-13-01-11-13-ENG



Precision balances
PS/X 4500/G
series

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NOVEMBER 2013

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1. TECHNICAL DATA

Balances PS/X:

Type	PS/X 4500/G
Max capacity	4500g
Min capacity	0,5 g
Accuracy	0,01 g
Verification scale interval	0,1 g
Tare range	-4500g
Linearity	0,01 g
Repeatabiliy	± 0,02 g
Temperature	+10 °C ÷ +40 °C
Power supply	13,5-16 V DC / 2.1 A
OIML class	II
Pan size	195 x 195mm

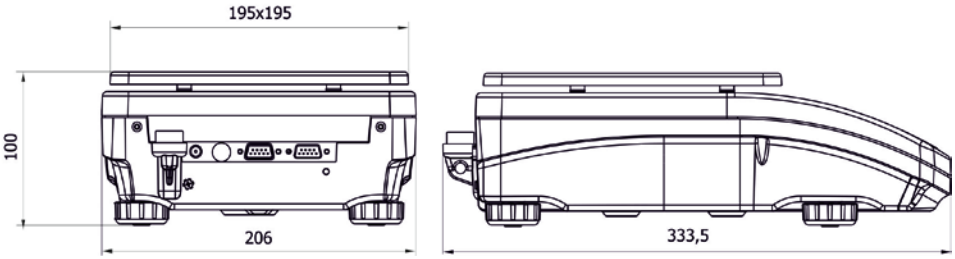


Fig. 1. Dimension of a balance

2. BASIC INFORMATION

2.1. Intended use

Precision balance PS/X series is designed to determining the weighing value of loads in laboratory environment. It is intended for application as a non-automatic weighing instrument only, i.e. the material to be weighed should be manually and carefully placed in the center of the weighing pan. Weighing result should be read only after stable reading has been obtained – stability pictogram is visible on balance's display.

2.2. Inappropriate use

Do not use the balance as a dynamic weighing instrument. Even if small quantities of weighed material are added or removed from the weighing pan of the instrument, the reading should be taken only after stabilization of the measurement result. Do not place any magnetic materials on the weighing pan, as this can cause damage of the measuring system of the instrument. Be sure to avoid impact shock and overloading the balance in excess of the prescribed maximum measuring range (max capacity), minus any possible tare weight that has been applied. Never use the balance in an environment endangered by an explosion. This balance has not been adjusted for operation in explosive areas. There must not be any modification made to the balance.

2.3. Warranty

Warranty is not valid at the following:

- Non-observation of the guidelines of this user manual,
- Use of balance other than specified in this manual,
- Alternation to or opening of the device (damaged of the protective stickers),
- Mechanical damage and damage caused by media, natural water, and tear,
- Inappropriate assembling or defects of electric installation,
- Overloading of the measuring instrument.

2.4. Monitoring metrological parameters of the balance

Metrological characteristics of the balance requires periodical inspection carried out by its operator. Inspection frequency is conditioned by ambient conditions in which the balance is used, types of performed processes and accepted quality management system in an organization.

2.5. Data included in this user manual

Please read the user manual carefully before assembling and startup, even if the user is experienced with this type of weighing instruments.

2.6. Staff training

This balance should only be operated and maintained by personnel who is trained and experienced in using this type of balances.

3. TRANSPORT AND STORAGE

3.1. Delivery check

Please check the packaging immediately upon delivery and the device during unpacking for any visible signs of external damage.

3.2. Packaging

Please retain all parts of the original packaging should the balance be transported in the future. Only the original packaging should be used for dispatching the balance. Before packing, disconnect all attached cables and remove any loose/movable parts (weighing pan, anti-draft shields, etc.). Please place balance and its components in their original packaging, and protect them against damage during transport.

4. UNPACKING, ASSEMBLING AND STARTUP

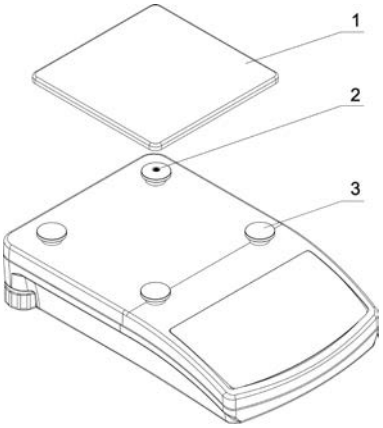
4.1. Assembling and place of use

- Balance should be stored and used in locations free of vibrations and shakes, free of air movement and dust,
- Ambient air temperature should not exceed the range of: $+10^{o}C \div +40^{o}C$
- During balance operation, ambient temperature in the weighing room should not change more than $3^{o}C$ within one hour,
- The balance should be located on a stable wall console desk or a stable working table which is not affected by vibrations and distant from heat sources,
- Take special safety measures when weighing magnetic objects, as part of the balance is a strong magnet. Should such loads be weighed, use under hook weighing option, which removes the weighed load from area influenced by the balance's magnet. For assembling the hook for under hook weighing option see the bottom section of balance's housing,
- In order to avoid influence of static electricity on the measurement process, ground the balance's housing. The grounding bolt is located at the back of balance's housing.

4.2. Unpacking

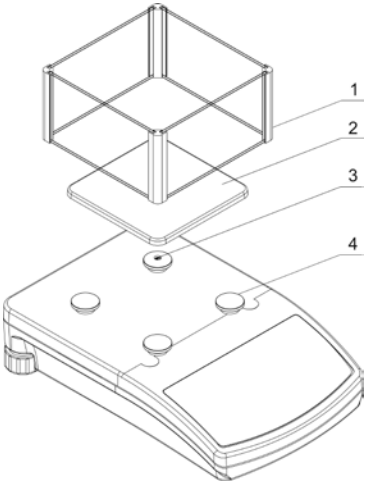
Carefully remove the balance from its packaging, remove the plastic, foil and cardboard transport protective elements and gently place the balance in its intended place of use. Assemble the weighing pan, and other elements according to below scheme:

Assembling components of a balance with measuring accuracy 10 mg:



- Remove the protective tape securing the mass spring on one of the rubber mandrels (2),
- Assembly the weighing pan (1) onto the rubber mandrels (3),
- On assembling check whether the weighing pan is placed firmly on the rubber mandrels.

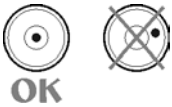
Assembling components of a balance with measuring accuracy 1mg:



- Remove the protective tape securing the mass spring on one of the rubber mandrels (3),
- Assembly the weighing pan (2) onto the rubber mandrels (4),
- Assembly the anti-draft shield (1) onto the top housing of the balance,
- On assembling check whether the weighing pan is placed firmly on the rubber mandrels.

Fig. 2. Assembling components of a balance PS/X series

4.3. Leveling



Before plugging to mains, level the device using two adjusting feet located at the back of balance's housing. Turn the adjusting feet in a way that the air bubble of the level is placed centrally. The level is located at the back wall of balance's housing.

4.4. Standard equipment

- Balance.
- Weighing pan and protecting (anti-draft) components.
- Power adapter.
- User manual on a CD.

4.5. Cleaning

Balance should be cleaned with damp cloth by gentle wiping the smudges of dirt. In order to clean the weighing pan of the balance, it is required to remove it from the weighing chamber.
CAUTION!!!
Cleaning of the pan when assembled may cause damage of the measuring system of the balance.

4.6. Plugging to mains

Balance can be plugged to mains only with a power adapter that comes standard with the balance. Nominal power supply of the power adapter (specified on the data plate of the power adapter) should be compatible to the power from mains.
Plug the balance to mains – the plugging socket is located at the back of balance's housing. Balance display will light and show name and number of software, after which balance will display 0.000g (for balances with resolution 1mg) or 0.00g (for balances with resolution 10mg).
If indication is other than zero, press **ZERO/TARE** key.

Before unplugging the balance from mains it is obligatory to switch off the display by pressing ON/OFF key on balance's overlay.

4.7. Connecting peripheral devices

The balance must be unplugged from the mains before connecting or disconnecting any peripheral devices (printer, PC computer). Use only peripheral devices recommended by the manufacturer with your balance. These have been ideally coordinated to your balance. On connecting a peripheral device, plug the balance to mains.

5. BASIC FUNCTIONS

Balance PS/X series enables determining mass in the following measuring units:

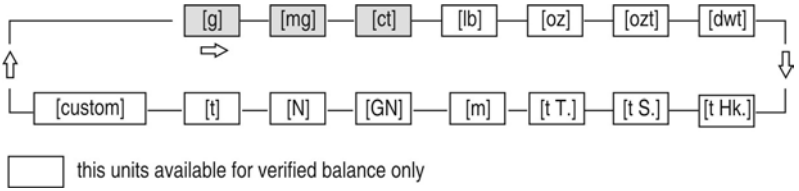


Fig. 3. Measuring units

Apart from determining mass of weighed object using different measuring units, the software balance PS/X series comprises the following working modes:

- Parts counting
- Checkweighing
- Dosing
- Percent setup
- Animal weighing
- Determining density of solids and liquids
- Formulation
- Statistics from completed measuring series

Both the measuring units and the working modes can be set as inaccessible in the user menu. This option is implemented for the purpose of adjusting balance to user needs and requirements, i.e. providing access only to those functions and units which are required by a user.

Determining accessibility attribute of a working mode / measuring unit is set in balance's menu and it is described further in this user manual.

6. DESCRIPTION

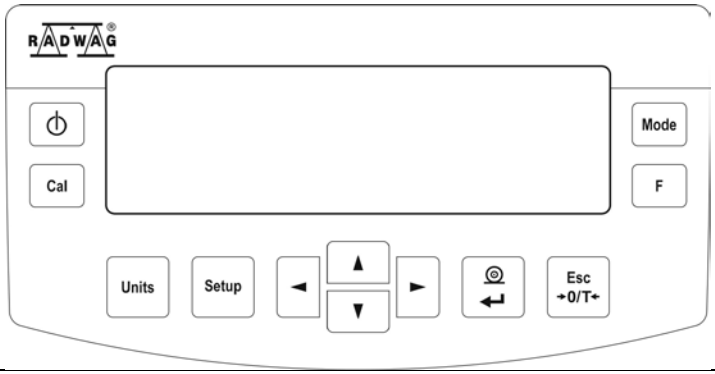
6.1. Graphic display

Fig. 4. Balance graphic display

1. Mass indication of weighed load or counted parts,
2. Measuring unit,
3. Pictogram denoting whether measurement result is stable,
4. „BARGRAPH” presenting which part of accessible measuring range is in use,
5. Text informing on enabled working mode,
6. Current date,
7. Current time,
8. Pictogram denoting, that the indication is in precise ZERO point.

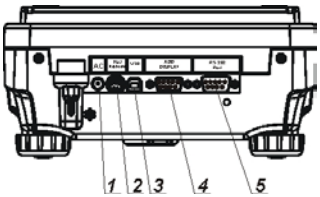
6.2. Keyboard

Each button of the balance's keyboard operates as a dual-function key, i.e. it can either carry out a specific function or be used to move in balance's menu structure.



⏻	**ON/OFF** key enables switching on and off balance's display. If switched off balance components other than the display are powered, and balance is in stand-by mode.
F	**F** key. Function key, which enables quick entering the settings of an active working mode
Mode	**MODE** key for selecting balance's working mode.
Units	**UNITS** key, changes measuring units.
◎ ↵	**PRINT/ENTER** key - Sends current display status to a peripheral device (PRINT) or accepts selected value of a parameter or function (ENTER).
Esc →0/T←	**ESC/ZERO TARE** key – zeroing / tarring of balance's indication.
Cal	Adjustment – function key of immediate initiating the adjustment / calibration process.
Setup	Function key for entering the main menu of a balance.
◄ ▲ ▼ ►	Navigating arrows for moving in balance's menu or changing parameter value

6.3. Sockets and interfaces



1. Power supply socket
2. Keyboard PS/2 type socket
3. USB port *(only in non legalization balances)*
4. RS 232 socket
5. Additional display socket

Fig. 5. Interfaces of a balance PS/X series

7. USER MENU

User menu of a balance PS/X series consists of 9 main menu groups named using letter P and a corresponding number. The name and content of the menu is presented below.

P1 Adjustment

01	Internal adjust.	| * * * * * * * * |	function
02	External adjust.	| * * * * * * * * |	function
03	User adjust.	| * * * * * * * * |	function
04	Adjustment test	| * * * * * * * * |	function
05	Weight correction	| * * * * * *0.0 |	
06	Automatic adjust	| * * * * * *0.3 |	both
07	Auto adjust. time	| * * * * * *0.3 |	3 hours
08	Report printout	| * * * * * *0.1 |	yes

P2 GLP

01	User	| Smith John |	
02	Project	| AR – 65/04 |	
03	Print time	| * * * * * * 0 |	no
04	Print date	| * * * * * * 0 |	no
05	Print user	| * * * * * * 0 |	no
06	Print project	| * * * * * * 0 |	no
07	Print Id	| * * * * * * 0 |	no
08	Print adjustment	| * * * * * * 0 |	no
09	Print adjust diff.	| * * * * * * 1 |	yes

P3 Date/Time

01	Date format	| * * * * * * * 0 |	D/M/R
02	Time format	| * * * * * * * 0 |	24 hours
03	Time	| * * * * * * * * |	function
04	Date	| * * * * * * * * |	function
05	Display time	| * * * * * * * 1 |	yes

06	Display date	* * * * * * * 1	yes

P4 Readout

01	Filter	* * * * * * * 3	normal (average)
02	Value release	* * * * * * * 1	fast+reliable
03	Display refresh	* * * * * * * 1	0.08 s
04	Autozero	* * * * * * * 1	yes
05	Last digit	* * * * * * * 1	always
06	Negative	* * * * * * * 0	no
07	Environment	1	stable

P5 RS - 232

01	Interface	* * * * * * * 0	RS 232
02	Baud rate	* * * * * * * 1	4800
03	Parity	* * * * * * * 0	no
04	Data bits	* * * * * * * 2	8 bits
05	Stop bits	* * * * * * * 1	1 bit
06	Automatic printout	* * * * * * * 0	no
07	Interval	* * * * * * * 1	* 0.1 s
08	Min. mass	* * * * * * * 4	10 d
09	Print stable	* * * * * * * 1	yes
10	Printer type	* * * * * * * 0	standard
11	Paper cut	* * * * * * * 0	no
12	Erase statistics	* * * * * * * 0	no

P6 Printout

01	Printout no.	* * * * * * * 0	standard
02	Printout 1 start	* * * * * * * 1	
03	Printout 1 stop	* * * * * * * 1	
04	Printout 2 start	* * * * * * * 1	
05	Printout 2 stop	* * * * * * * 1	
...	. . . . .	* * * * * * * 0	
10	Printout editing	* * * * * * * *	function
11	String 1	* * * * * * * 1	
11	String 2	* * * * * * * 4	
...	. . . . .	* * * * * * * 1	
90	String 80	* * * * * * * 0	

P7 Units

01	Grams	* * * * * * * 1	yes
02	Milligrams	* * * * * * * 1	yes
03	Carats	* * * * * * * 1	yes
04	Pounds	* * * * * * * 1	yes
05	Ounce	* * * * * * * 1	yes

06	Ounce troy	* * * * * * * 1	yes
07	Dwt	* * * * * * * 1	yes
08	Taele Hk.	* * * * * * * 1	yes
09	Taele S.	* * * * * * * 1	yes
10	Taele T.	* * * * * * * 1	yes
11	Mommes	* * * * * * * 1	yes
12	Grains	* * * * * * * 1	yes
13	Newton	* * * * * * * 1	yes
14	Tical' e	* * * * * * * 1	yes
15	Custom unit	* * * * * * * 1	yes
16	Custom unit coef.	1.0	

P8 Working modes

01	Parts counting	* * * * * * * 1	yes
02	Checkweighing	* * * * * * * 1	yes
03	Filling	* * * * * * * 1	yes
04	Percent setup	* * * * * * * 1	yes
05	Animal weighing	* * * * * * * 1	yes
06	Density	* * * * * * * 1	yes
07	Formulation	* * * * * * * 1	yes
08	Cereals density	* * * * * * * 1	yes
09	Statistics	* * * * * * * 1	yes

P9 Other

01	ID setting	* * * * * * * *	function
02	Autom. ID print	* * * * * * * 0	no
03	Beep	* * * * * * * 1	yes
04	Language	* * * * * * * 1	English
05	Backlight	* * * * * * * 1	yes
06	Brightness	* * * * * * * *	function
07	Contrast	* * * * * * * *	function
08	Screen saver	* * * * * * * 0	no
09	Temperature	* * * * * * * *	function
10	Factory no.	114493 * * *	
11	Software no.	MBS w.04	
12	Parameter printout	* * * * * * * *	function
13	Upload parameters	* * * * * * * *	function
14	Password protect	* * * * * * * *	function

Parameters type in the user menu:

- function – having a specific operation, e.g. balance adjustment
- selectable – enables selecting one of a few available values, which are permanently set in balance's memory, like: display refreshing, screen saver, determining availability of a measuring unit or a working mode.
- Enabling data entering – balance user can enter a value of a parameter, e.g. set date, time, user no, strings (texts) in a printout.

Balance menu on the display – graphic presentation

While in the weighing mode press **SETUP** key. The display opens balance's main menu (display I). Press UP or DOWN navigating arrows on the balance's overlay to move the cursor upwards or downwards in the menu content. Place the cursor next to a menu option to be previewed. Press **RIGHT ARROW** navigating key on balance's overlay to open the submenu content (display II).

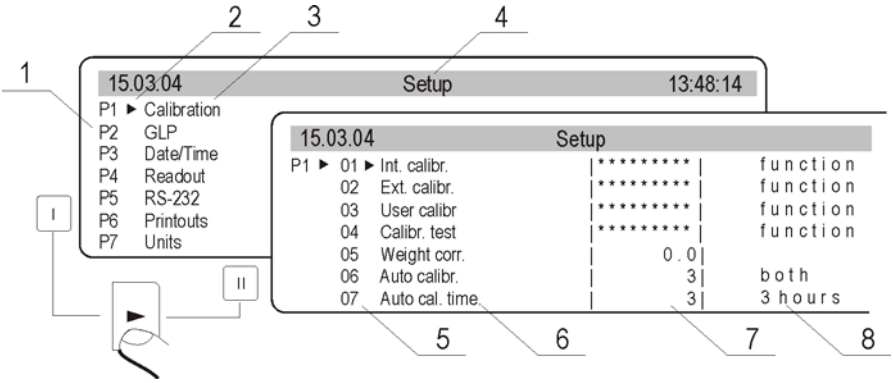


Fig. 6. Balance menu

1 – balance menu no.

2 – cursor for selecting a menu option

3 – menu content name

4 – name of selected menu option (setting)

5 – submenu number

6 – submenu name

7 – attribute set for a submenu option

8 – value (description) of an attribute set a submenu option

7.1. Moving through the menu

Moving in the user menu can be carried out using:
- Balance keyboard,
- External PC keyboard PS/2 type connected to balance's socket,
- Commands sent from a connected computer to a balance

7.1.1. Moving through user menu using a balance keyboard

Setup key. Entering balance's main menu

Moving the cursor down in the menu list

Moving the cursor up in the menu list

Selecting submenu for activating. On pressing the key, the display indicates the content of a selected group.

Exit to previous menu level, e.g. to main menu

Esc/TARE key. Abandon parameter changes

7.1.2. Return to weighing mode

Changes introduced in balance memory will be saved on returning to weighing with procedure of saving changes. Press ESC key for a few times until the display shows a question: Save? As displayed, select one of available options:

ENTER – save changes and go back to menu;
ESC – abandon changes and go back to menu.

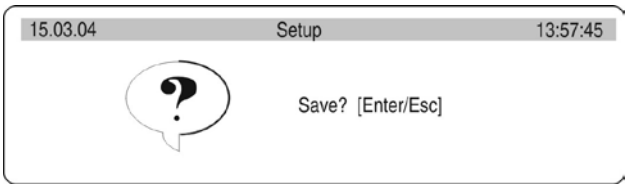


Fig. 7. Return to weighing mode

7.1.3. Moving through user menu using external computer keyboard PS/2 type

Al keys and buttons located on balance's overlay have their equivalents on a computer keyboard PS/2 type. See below table for reference:

- equivalents of function keys

	Description	Key on balance's overlay
	ON/OFF key enables switching on and off balance's display	
	Function key for entering the main menu of a balance	
	Selecting balance's working mode, e.g.: animal weighing	
	Selecting measuring unit	
	PRINT key	
	TARE key	

- equivalents of navigating arrows

	Moving the cursor up in the menu list	
	Exit to higher level in menu structure , e.g. to main menu	
	Entering settings of a selected submenu.	
	Moving the cursor down in the menu list	

- equivalents of ENTER / PRINT key and ESC key

Enter	Accepting entered value of a parameter	
Esc	Abandon parameter changes and exit to to main menu	Esc →0/T←

7.1.4. Moving through user menu using virtual keyboard, via RS 232 interface

Most of the functions controlled or set using keys on balance's overlay or an external computer keyboard PS/2 type can be carried out by a set of commands sent from a computer to a balance.
The commands enable moving through user menu, setting parameters or controlling balance operation. The list of commands is provided at the end of this user manual.

7.2. User menu - content

The content of balance's menu is presented in point 6 of this user manual.

Menu structure of a balance PS/X series is described in point 5 of this user manual. When in the main weighing window press **Setup** key to enter the main menu settings. The display opens a list with main menu. By pressing up and down navigating arrows move the cursor and place it next to a submenu to be edited.

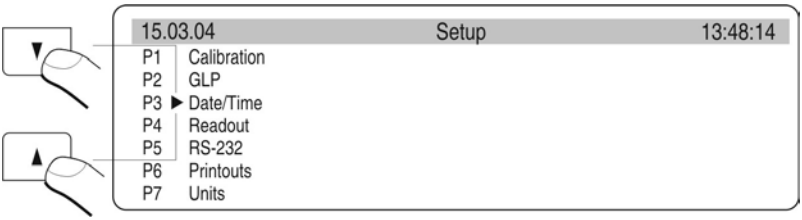


Fig. 8. Balance main menu – submenu selection

In order to edit a submenu, press **RIGHT ARROW** key, which opens the content of selected submenu. When inside the submenu structure, the user can select an option to be edited (modified) by placing the cursor next to submenu name (use up and down navigating arrows). When the cursor is placed next to desired option press **RIGHT ARROW** key to enter submenu settings.

Balance reactions for above procedure:

- A specific process (e.g. balance adjustment) which is carried out in a submenu described as a function;
- Editing an attribute of a submenu (flickering digit of a submenu setting enables changing parameter value of entering a sequence of characters)

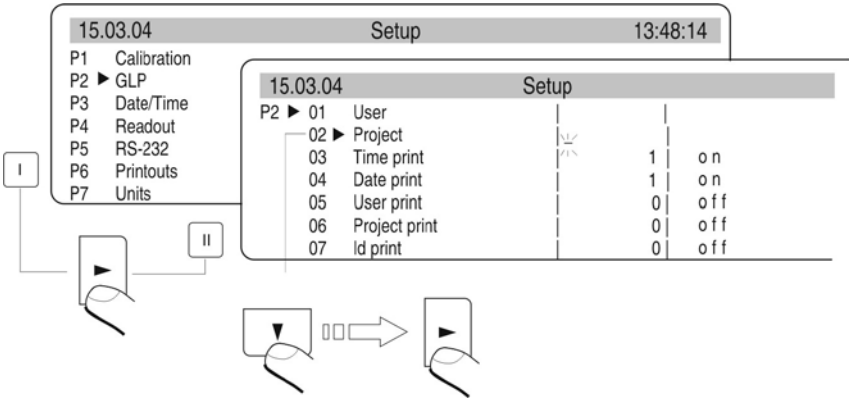


Fig. 9. Balance submenu – selection buttons

8. WEIGHING

Basic working conditions for obtaining reliable measurement results:

- Stable and constant temperature in a weighing room,
- Stable foundation of a balance,
- Selecting adequate balance settings adjusted to ambient conditions at a workstation.

1 Before start of weighing process or in case of essential change of ambient conditions at a workstation (e.g. ambient temperature change at a workstation more than 1°C/h) the balance requires adjusting. The procedure of balance adjustment is described in point 9.1 of this user manual.

2 Before start of weighing procedure, it is recommended to load the balance's weighing pan a few times with mass close to balance max capacity, Check if unloaded balance indicates "precise zero" →0← (the pictogram is visible on in the upper left corner of balance's display) (and only if parameter P4 06 Autozero is set to 1: yes) and whether measurement is stable – ◣◢ (the pictogram is visible in the upper right corner of the display. If the mass indication is other than zero, press zeroing key

3 If the working conditions are unfavourable (i.e. unstable measurement result), then the display previews dashes (horizontal lines). After exceeding a preset amount of time for zeroing the indication, the balance returns to weighing mode without zeroing the indication. In such case the user should wait for stabilization of working conditions and once again press →**0/T**← key.

4 Press **Units** key to set a measuring unit. Place weighed object on balance's weighing pan and read the result only on stabilization of the measurement. If the measuring unit is not displayed on pressing the **Units** key, then go to the corresponding submenu and check the accessibility attribute of the measuring unit.

5 Mass indication of a load placed on balance's weighing pan can be zeroed for multiple times. Pay attention not to exceed maximal capacity of a balance by applying multiple zeroing function.

6 During times between carrying out the following measurement series do not unplug the balance from mains. It is recommended to switch off balance's display by pressing **ON/OFF** key. On repeated pressing of the **ON/OFF** key the balance is ready for operation and does not require thermal stabilization.

8.1. User log in function

The users of a balance PX/X series can have their specific access code to the balance's menu. The password system is determined by balance's administrator, i.e. a user of the higher order in relation to the other balance users. The access password can comprise up to 6 digits.

Balance software enables determining:

- A single Administrator, who has access to all balance settings and software functions, including changing the password of the administrator and other users.
- A single User who is authorized to access balance settings and functions, as set by the balance administrator.

Setting passwords and access levels

- *Remember, that after the first entering the password settings (see parameter P9 14 Password protection), the user should set a password for the balance Administrator.*
- *The software requires inserting an administrator password when entering parameter P9 14 Password protection only if the administrator password is other than "0".*
- *On the following entering this parameter, the software will require inserting the administrator's password. Access to parameter settings of submenu P9 14 Password protection will be granted only on entering correct password. Unless the password is correct, the balance displays a message on incorrect password and goes back to displaying previous screen.*
- *Depending on the settings, the inserted password is previewed either as a sequence of digits or as asterisks (the initial value of each entered digit is always = 0)*

Following the point 6.1.1 menu **P9 Other** contains the following options:

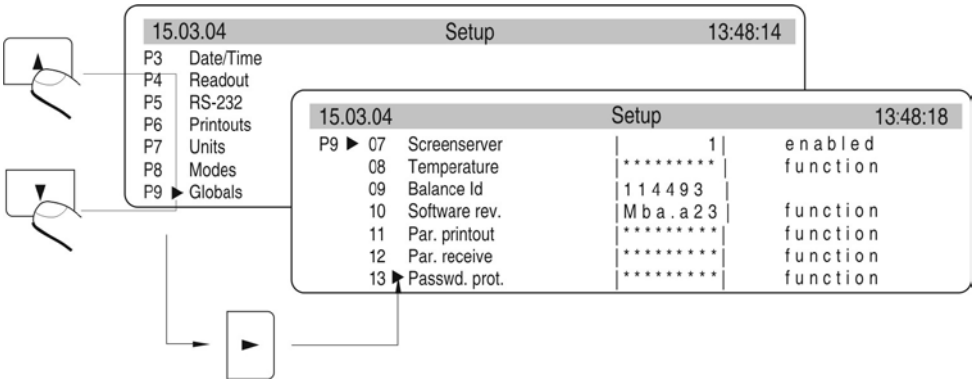


Fig. 10. Password – function activating

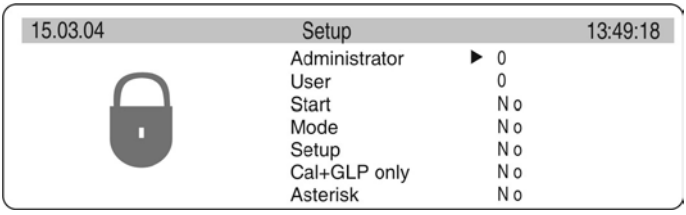


Fig. 11. Password protection – menu content

- **Administrator**
  the field for inserting administrator's password. Balance administrator has access to all balance functions and settings
- **User**
  the field for inserting user's password, Balance user has access to the functions and settings which attribute is set to YES (password protection) and to other balance settings and functions
- **Startup**
  if the option is set to YES, then on balance startup the software requires entering a password
- **Functions**
  if the option is set to YES (password protection), then use of functions other than weighing is accessible only on entering a password (of an administrator or a user)
- **Settings**
  if the option is set to YES (password protection), then changes to the balance settings can only be carried out on entering a password
- **Cal + GLP only**
  if the option is set to YES, then a user is authorized (with no need to enter a password) to carry out adjustment / calibration procedure and change settings in the submenu P2 GLP. Changes of any other balance settings require entering a password.
- **Asterisk**
  if the option is set to YES , then on balance startup the entered password is previewed in a form of asterisks.

Entering Administrator's password

Enter a password for the balance administrator (a sequence of 6 digits) and for the user. Balance administrator has full access to balance menu. The user access is limited to the one described in previous point (balance menu, startup, adjustment, etc. options can be attributed YES/NO).
It is very important to remember the password, as if option "password on startup" is enabled (set to YES), then on the following plugging the balance to mains, the software will request for entering the password. If it is entered incorrectly, then balance operating will be blocked.

While entering the password use balance keys presented on Fig. 2 or use external keyboard PS/2 type connectable to balance's socket.
Set accessibility criterion to other balance settings and functions, depending on access level required by the balance user.

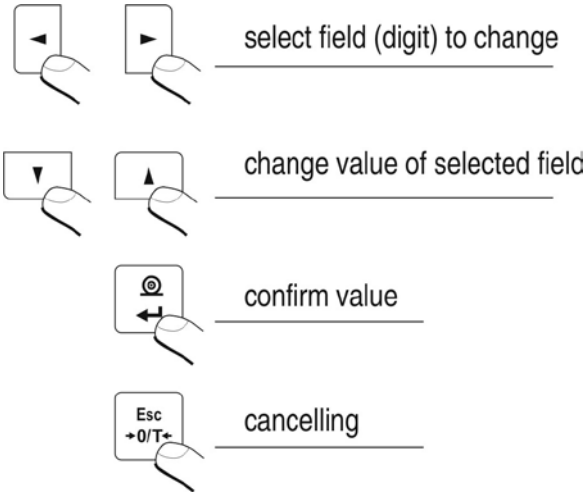


Fig. 12. Keys on balance overlay – entering values while editing fields of balance menu

9. BALANCE ADJUSTMENT

In order to ensure the highest measuring accuracy, it is recommended to periodically introduce to balance memory a corrective factor of indications in relation to a mass standard – i.e. balance adjustment.

Adjustment should be carried out:

- Before the beginning of a weighing procedure,
- If long breaks between following measuring series occur
- If temperature inside the balance changes more than: 1°C within last hour

Types of adjustment

- Internal automatic adjustment
  - * triggered by temperature change
  - * triggered by elapsing time
- Manual internal adjustment
  - * initiated from balance's keyboard (triggered by pressing CAL key)
- Adjustment with an external weight
  - * with declared mass which cannot be modified
  - * with optional mass which needs to be specified before process initiation

Caution:
In case of verified balances only the automatic internal adjustment and manual internal adjustment systems are available for a user.

Remember to perform the adjustment when there is no load on the pan!

9.1. Automatic balance adjustment

Activation of automatic internal adjustment is triggered on:

- Elapsing a specified amount of time from last carried out adjustment process, or
- Ambient temperature changes by a value specified by the balance manufacturer

On recognizing any of the above case, balance's display shows the following message box.

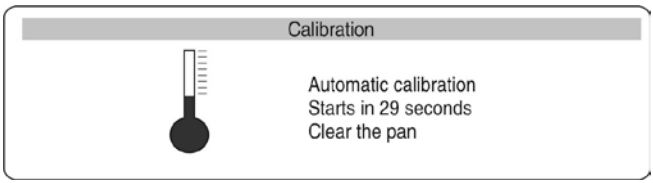


Fig. 13. Automatic internal adjustment – display content

The time delay enables the user to take the weighed load of the weighing pan, if a weighing process is in progress. Pressing T/O key causes temporary delay of the adjustment process initiation. In approximately 5 minutes the needs for adjustment is triggered once again.

Automatic adjustment settings

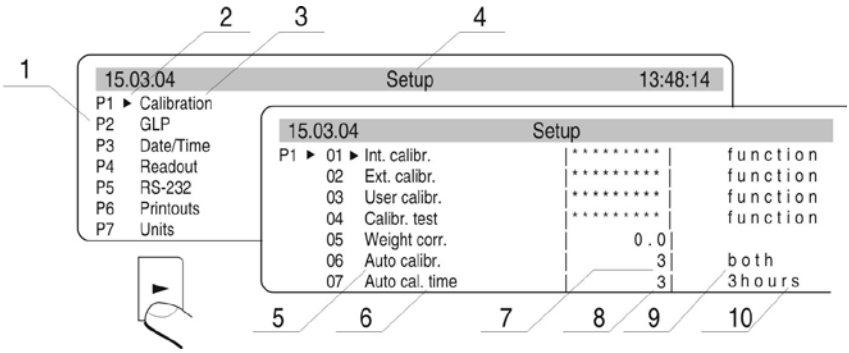


Fig. 14. Settings of automatic balance adjustment

1 – main menu number

2 – marker of selected function

3 – function name

4 – name of an active function / mode / process

5 – selecting factor triggering auto-adjustment process (time / temperature)

6 – determining time interval between the following auto-adjustment processes

7 – value of set auto-adjustment triggering factors

8 – value of set time interval between the following automatic adjustment processes

Changing the values of automatic adjustment triggering factor and automatic adjustment time causes changes in description of the above fields (fields in fig no. 9 and 10).

01 Internal automatic adjustment

Initiates internal automatic adjustment process, which is carried out fully automatically with no operator's activity. If balance's weighing pan is loaded, then the balance displays a command ordering unloading it.

02 External adjustment

Adjustment process carried out with an external weight, which value is saved in balance's memory. The function is disabled in verified balances.

03 User adjustment

Adjustment process carried out with an optional weight. Mass of the weight is specified before process initiation. The function is disabled in verified balances.

04 Adjustment test

Mass comparison of internal adjustment weight with its value saved in balance memory

05 Internal weight correction

The function enables correcting the value of internal adjustment weight. The function is disabled in verified balances

06 Automatic adjustment

Determination of factors triggering start of automatic internal adjustment:

0 no – none of factors will cause start of adjustment
1 time – adjustment triggered by time interval set in point 07
2 temperature – adjustment triggered by change of temperature
3 both – adjustment triggered by time and temperature

Function not available in verified balances.

07 Time of automatic adjustment

Determination of time interval, after which automatic adjustment process is initiated. Function not available in verified balances.

Return to weighing mode

Changes introduced in balance memory will be saved on returning to weighing with procedure of saving changes. Press ESC key for a few times until the display shows a question: Save? As displayed, select one of available options:

ENTER – save changes and go back to menu;
ESC – abandon changes and go back to menu.

(see point 7.1.2. Return to weighing)

9.2. Adjustment test

Adjustment test is a comparison of internal adjustment weight with its value stored in balance's memory. This process is carried out automatically and its result is shown on the display.

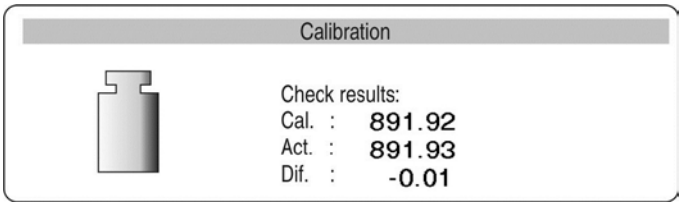


Fig. 15. Adjustment test

Cal. – the value of internal adjustment weight
Curr. – weighing result of the internal adjustment weight
Dev. – deviation calculated between the both values

Return to weighing mode

Changes introduced in balance memory will be saved on returning to weighing with procedure of saving changes. Press ESC key for a few times until the display shows a question: Save? As displayed, select one of available options:
ENTER – save changes and go back to menu;
ESC – abandon changes and go back to menu.
(see point 7.1.2. Return to weighing)

9.3. Manual adjustment

9.3.1. Internal adjustment

Press CAL key on balance's overlay, or

1. Go to submenu P1 – Adjustment.
2. Place the marker next to a function 01 Internal adjustment.
3. Press **RIGHT ARROW KEY**.
4. The balance automatically carries out internal adjustment process. While adjustment process is in progress do not load the weighing pan with any weight.
5. On completing the internal adjustment procedure the balance saves adjustment data in its memory and returns to weighing mode.

Caution:

- *In order to abort adjustment process press ESC key.*
- *If during internal adjustment process the weighing pan is loaded, then the balance displays an error message. The adjustment process is automatically stopped. On taking off the load from the weighing pan, the process is resumed and completed.*
- *If the DRH function is enabled in balance settings, then balance user cannot abort the adjustment process once initiated.*

9.3.2. External adjustment

The external adjustment in balances PS/X series should be carried out with an external mass standard / weight class: **F_1**

1. Go to menu P1 – Adjustment.
2. Set the marker next to a function 02 External adjustment.
3. Press **RIGHT ARROW KEY**.
4. The software displays a command to take off any load from the weighing pan (the weighing pan must by empty). On unloading the weighing pan, press ENTER key.
5. The balance determines mass of an empty weighing pan.
6. Load a weight / mass standard which mass is given on the display and press ENTER key.
7. On completing adjustment process the balance returns to displaying submenu P1 - Adjustment
8. Return to weighing mode – in accordance with point 7.1.2.

If the DRH function is enabled in balance settings, then external adjustment process is disabled. The DRH function is enabled in verified balances (which are subject to conformity assessment.

9.3.3. User adjustment

The external adjustment in balances PS/X series should be carried out with an external mass standard / weight class: **F_1**

- Go to menu P1 – Adjustment and set the marker next to a function 03 User adjustment.
- Press **RIGHT ARROW KEY**.
- The balance displays a command to enter mass of an adjustment weight. The first digit of the weight value is flicering, and it is ready for editing.

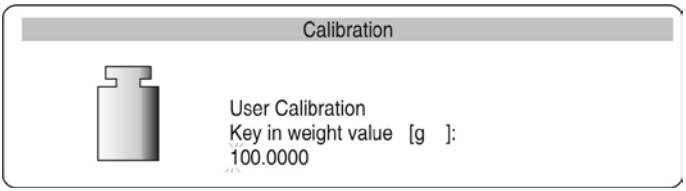


Fig. 16. User adjustment – declaring weight value

- Use function kwys (as specified in point 6.1.1 of this user manual) to enter the value of the external weight/mass standard.
- Accept the weight's value as entered. The balance initiates adjustment process by indicating process commands on the display.
- The balances shows a command on determining mass of the empty weighing pan, which is followed by a command to place a weighed with pre-determined mass.

- On placing the determined weight on the weighing pan accept it by pressing **Enter** key.
- On completing adjustment process the balance returns to displaying submenu P1 - Adjustment.
- Return to weighing mode – in accordance with point 7.1.2.

It is recommended that the mass of an external adjustment weight is approximately ¾ of balance's maximum capacity.

If the DRH function is enabled in balance settings, then external adjustment process is disabled.

9.4. Adjustment report printout

On completion of any type of adjustment process, the balance enables preparing a report from adjustment process. The report can be printed on a connected printer and sent to a computer and saved in a form of file for records.

P1 08 Report printout : 1: yes – report printout enabled
P1 08 Report printout : 0: no – report printout disabled

Remember, that if the parameter is set for 1 (**YES)**, then a report is generated and sent automatically.

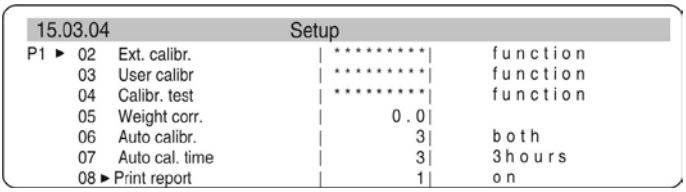

15.03.04 Setup
P1 ► 02 Ext. calibr. | ********| function
03 User calibr | ********| function
04 Calibr. test | ********| function
05 Weight corr. | 0.0|
06 Auto calibr. | 3| both
07 Auto cal. time | 3| 3hours
08 ► Print report | 1| on

Fig. 17. Submenu: Adjustment

The content of the report from adjustment process depends on settings of GLP parameters. Any option in the GLP submenu which attribute is YES is included in a report from adjustment process.

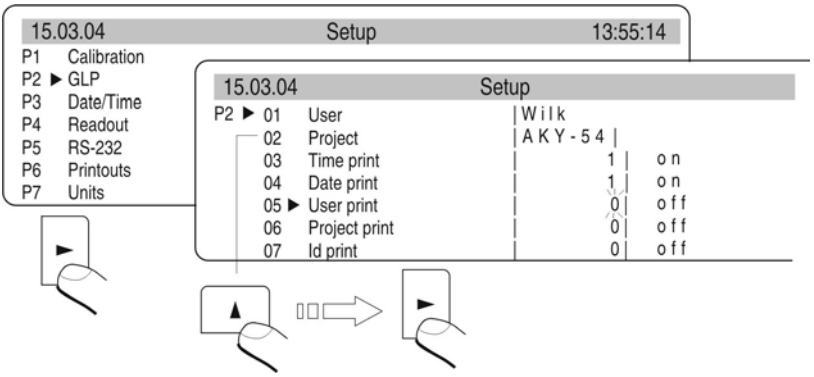


Fig. 18. Submenu GLP - settings

Apart from information set in menu group the report contains: type of completed adjustment process (description Calibration:) and deviation from the adjustment process (description Deviation:).

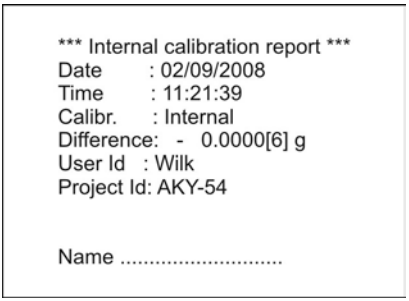


Fig. 19. An example of a report from adjustment process

10. DETERMINING CONTENT OF A PRINTOUT FOR GLP PROCEDURES

Menu P2 GLP is group of the parameters which enables declaring variables that are present on a printout from adjustment process. Fields referring to:

- user (max 8 alphanumeric characters)
- project (max 8 alphanumeric characters)

are editable are enable entering a text using balance's keyboard or connectable external computer keyboard PS/2 type. The other fields listed in the GLP are set:

- 1 yes (print on a report)
- 0 no (do not print on a report)

The content of submenu GLP is provided in point 8 of this user manual.
For the purpose of more convenient moving in the user menu and changing menu settings it is recommended to use external computer keyboard PS/2 type.

11. DATE AND TIME SETTINGS

The balance PS/X series features an internal real-time clock, and its parameters are editable. Go to submenu P3 Date/Time following prompts given on below figure.

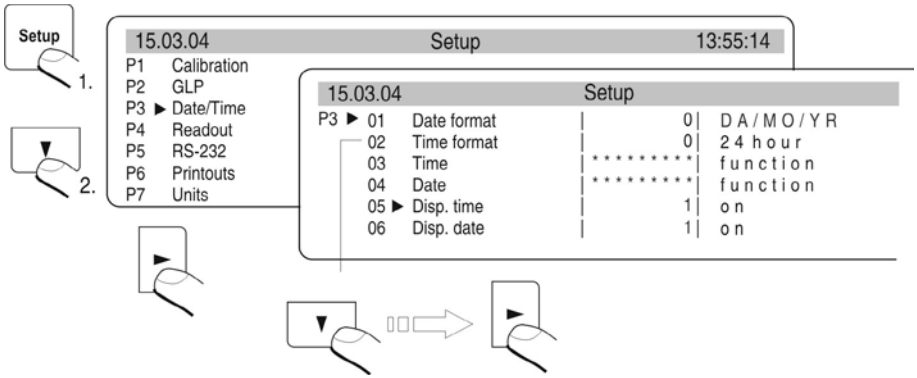


FIg. 20. Submenu Date / Time

01 Date format
Enables two types of setting date format:

- 1 date format Month/Day/Year
- 0 date format Day/Month/Year

On selecting appropriate date format accept it by pressing ENTER key.

02 Time format
Enables two types of setting time format:

- 1 time format 12 hours
- 0 time format 24 hours

On selecting appropriate time format accept it by pressing ENTER key.
12 hour time format is differentiated by letters PM or AM present on printouts.

03 Time

Press **RIGHT ARROW KEY** to enter parameter 03 Time, as presented on below figure.

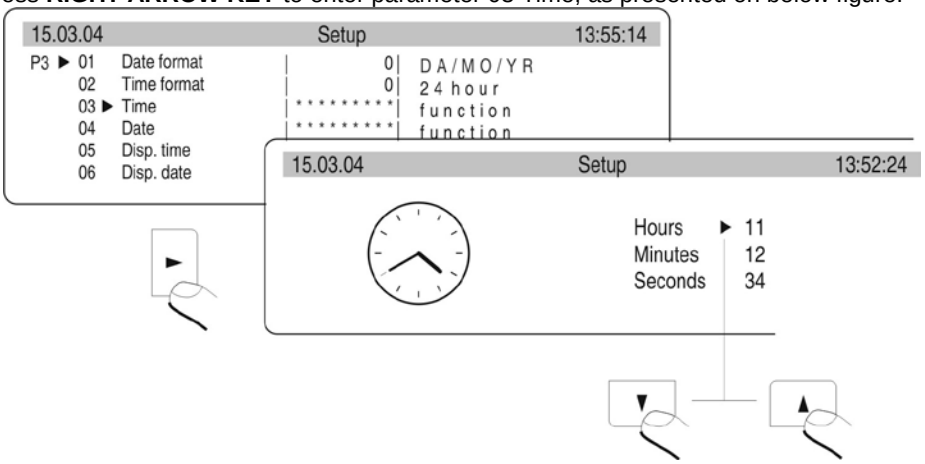


Fig. 21. Submenu Date / Time – time setting

Place the marker next to a value to be edited (Hour, Minute, Second). Activate a field for editing by pressing **RIGHT ARROW KEY**. Press **UP** and **DOWN ARROWS** to set numeric values of hour / minute / second.

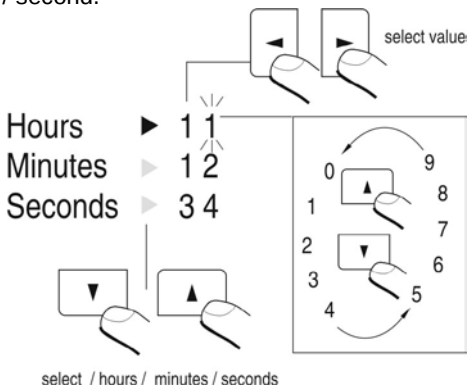


Fig. 22. Submenu Date / Time – time setting – controlling keys

Accept set value (the last digit stops flickering).

Repeat the activity for other time values. On setting the new time value press ENTER key. The balance returns to displaying submenu P3 Date/Time. The time value visible in the upper bar graph of the display is changed.
On setting required time value return to weighing mode as specified in point 7.1.2 of this user manual.

04 Date

Press **RIGHT ARROW KEY** to enter parameter 04 Data. As specified in the previous point (03 Time) set current date. On setting required date return to weighing mode as specified in point 7.1.2 of this user manual.

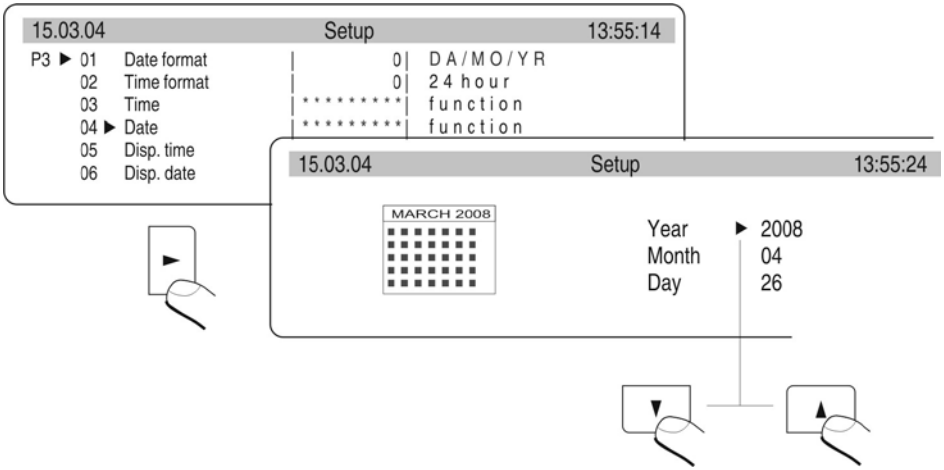


Fig. 23. Submenu Date / Time – date setting

05 Display time

Available settings
1 – YES time displaying enabled, the upper bargraph of the display contains time,
0 – NO time displaying disabled.

06 Display date

Available settings
1 – YES date displaying enabled, the upper bargraph of the display contains date,
0 – NO date displaying disabled.

Return to weighing mode

(see point 7.1.2. – Return to weighing mode)

12. SETTING BALANCE OPERATING PARAMETERS

Balance PS/X series, in menu group <P4 Readout> enables adjusting balance operation to current ambient conditions at a workstation (filter) and required user needs (display refreshment, autozero, displaying last digit).

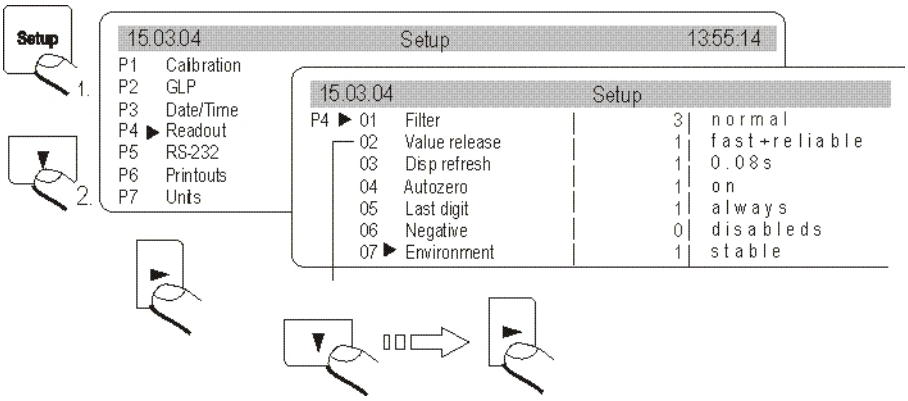


Fig. 24. Submenu Readout – internal settings

12.1. Iter settings

Depending on the ambient conditions at a workstation, the balance enables setting the filtering value. In case of very good operating conditions it is recommended to set the filtering value to very fast (parameter value 01 Filter set to 1). If the operating conditions are harsh (air drafts, vibrations) set the filter to slow or very slow (parameter value 01 Filter set to 4 or 5). The effectiveness of filter operation differs in relation to the measuring range. The filter operates with lower accuracy while the mass indication is quickly increasing after placing a load on the weighing pan. Filter accuracy is increased when weighed mass is within filter's set operation range (parameter: filter operation range is available only in balance's service menu, and it is inaccessible for the user). Depending on filter settings the weighing time is either shorter (low filter values) or longer (high filter settings).

12.2. Value release

Select one of available value release options: fast, fast+reliable or reliable. Depending on accepted criterion the weighing time will be shorter or longer.

12.3. Time interval of display refreshment

The parameter determines time interval in which display indication is refreshed.
In case of the higher refreshment values, the display does not indicate intermediate and unstable mass values occurring while loading and unloading weighed mass on the weighing pan. For low refreshment values the display indicates any changes in the value of weighed mass – which is required while dosing loose or liquid materials. The time interval of display refreshment is set in seconds.

12.4. Autozero function

Dla zapewnienia dokładnych wskazań wagi wprowadzono programową funkcję „AUTOZERO”. Zadaniem tej funkcji jest automatyczna kontrola i korekta zerowego wskazania wagi.

If AUTOZERO function is enabled, then each weighing process starts from precise zero point. There are, however, some cases when this function can be a disturbing factor of measuring process; for instance very slow placing of a load on the weighing pan (e.g. load pouring) – in such case system of zero indication correction can also correct actual indication of loaded mass. AUTOZERO function is enabled or disabled in parameter P4 03 as specified in point 6.1.1 of this user manual.

12.5. Last digit

In order to ensure adequate operating comfort with a balance, the user can determine presence of the last digit on the display and criteria of its displaying.
Available settings are:

- 0 never
- 1 always
- 2 when stable

12.6. Negative

The function aids previewing mass value and other indications on the display. Depending on user needs it is possible to enable or disable the function.

12.7. Operating conditions

This parameter enables two settings: stable or unstable. Setting the parameter to stable causes much faster operation of the balance, i.e. the weighing time is shorter than compared to setting: unstable. This parameter refers to operating and ambient conditions at a workstation. If the conditions are unstable, then it is recommended to set the parameter to *unstable*. The default setting of the parameter is: stable.

13. RS 232 FUNCTIONS

Balance PS/X series enables defining parameters of balance communication with a computer or a printer.

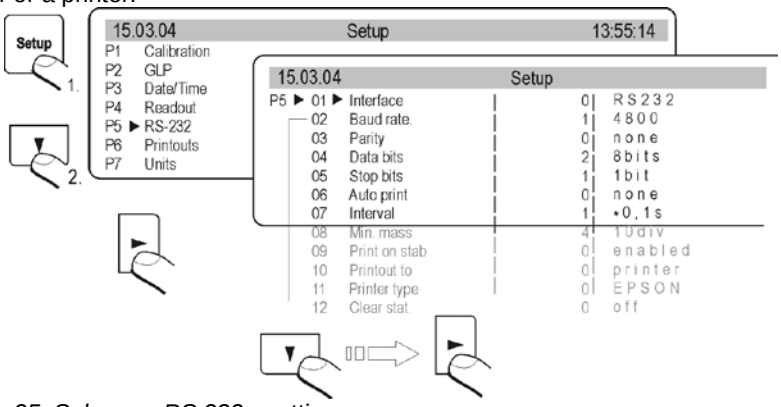


Fig. 25. Submenu RS 232 - settings

01 Interface	/ 0 : RS232	1 : USB*	2 : RS232+USB*
02 Baud rate	/ 0 : 2400	1 : 4800	2 : 9600 3 : 19200
03 Parity	/ 0 : no	1 : even	2 : odd
04 Data bits	/ 1 : 7 bits	2 : 8 bits	
05 Stop bits	/ 1 : 1 bit	2 : 2 bits	
06 Handshake	/ 0 : no	1 : RTS/CTS	2 : XON/XOFF
07 Automatic printout	/ 0 : no	1 : continuous	2 : with interval 3: when stable

08 Interval — the interval determines the period of time in which the balance sends display indication to a printer/computer. The interval is set according to a relation x 0.1 s = interval time). The available range of the parameter setting from 1 to 9999.

09 Min mass — Minimamum mass for enabling automatic operation of the RS 232. The following measurement data is sent only if taking off the load the mass indication returns below the set value mininum threshold

10 Print stable — 0 : no 1 : yes

11 Printer type — Epson or standard

12 Paper cut — Available only in EPSON printers featuring this function. If the function is set to YES then paper cut option is carried out automatically.

13 Clear stat. — /0: no 1: on header 2: on footer
The option is enabled in <STATISTICS> mode, where the header is printout no.1, and the footer is printout no. 2. Means of designing the printouts and operation of <STATISTICS> mode is described further in this user manual.

* *- only in non legalization balances*

On setting appropriate parameter values return to the weighing mode in accordance with point 7.1.2. of this user manual.

14. PRINTOUTS

Printouts menu is dedicated for creating non-standard printout templates and selecting type of a printout which is printed. Detailed description of non-standard printouts is provided in point 19. of this user manual.

15. SETTING ACCESSIBILITY OF MEASURING UNITS

This group of parameters enables setting accessibility of measuring units, which are available for an operator after pressing the **Units** key on balance's overlay.

All measuring units which attribute is set to
1: yes
are accessible from the main menu level under a key for toggling between the measuring units.
The measuring units described as 09 Taele Hk., 10 Taele S., 11 Taele T . the following relations occur:

- If the attribute of all three measuring units is set to 1: yes, then the software will display only the first one, i.e. 09 Taele Hk
- If the measurement should be carried out using 11 Taele T unit, then the attribute of the other two units should be set to 0 : no

Enter group of parameters P7 Units.

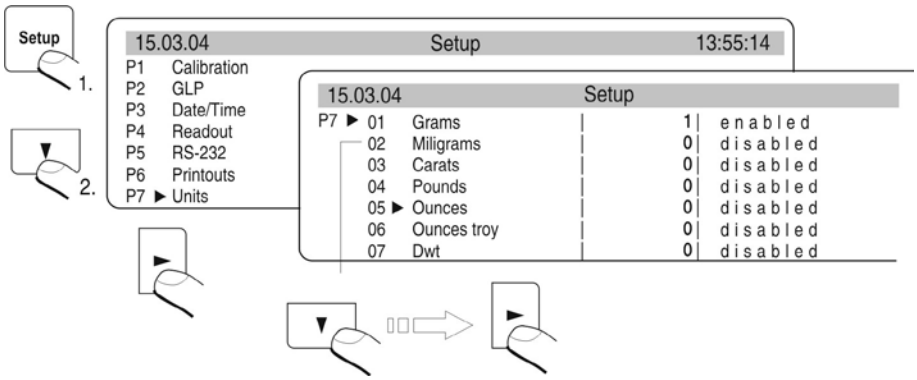


Fig. 26. Measuring units - settings

After setting the required parameter values return to weighing mode in accordance with point 7.1.2. of this user manual.
Caution:
In case of verified balances the available measuring units are limited to: [g], [mg], [ct] – even if set to 1 – YES in balance's menu

16. SETTING ACCESSIBILITY OF WORKING MODES

This group of parameters enables setting accessibility of working modes, which are available for an operator after pressing the **Mode** key on balance's overlay.

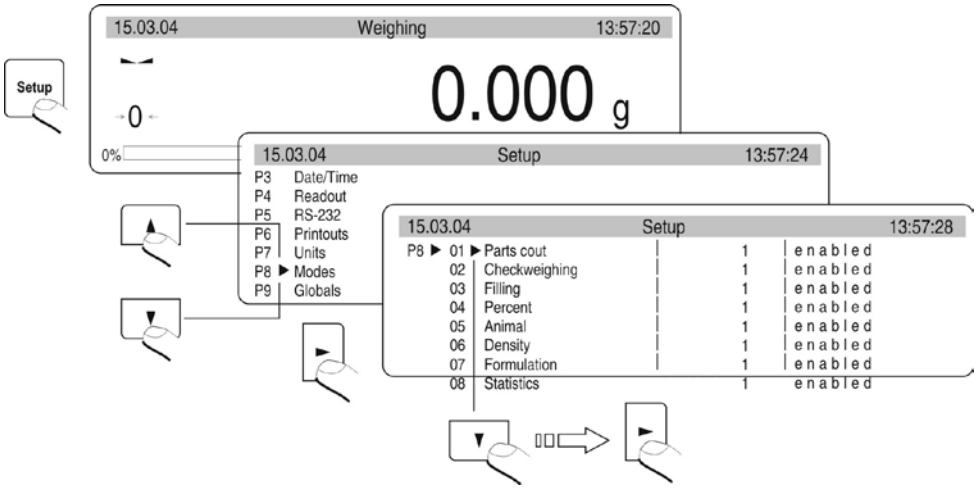


Fig. 27. Working modes - settings

All working modes which attribute is set to 1: yes are accessible from the main menu level under a key for toggling between the working modes. Changes to the parameter values are carried out in accordance with point 7.1.1 of this user manual.

17. OTHER PARAMETERS

Depending on user needs the balance enables setting parameters influencing its operation. These parameters are grouped in menu P9 Other, for instance: beep sound on pressing a key/button, screen contrast, etc. Enter submenu P9 Other to change its settings.

01 ID settings
The submenu contains 6 codes each comprising 6 digits. The codes are used in printouts for specifying a product, operator, product batch, etc.

02 Automatic ID Printout
If set to YES, then it prints all numeric codes. If set to NO, then the codes are not printed.

03 Beep sound
Determines whether each pressing of a key/button on balance overlay is confirmed by a beep sound, available settings: YES/NO.

04 Language
Selecting language version of software menu, available settings Polish or English

05 Backlight
Determines whether the backlight of the balance's graphic display should be enabled or disabled (enabling the backlight option improves data visibility on the display)

06 Screen brightness
Enables changing the brightness of the balance's graphic display – entering the function opens a window for setting brightness level using buttons on the balance's overlay

07 Screen contrast
Enables changing the contrast of the balance's graphic display – entering the function opens a window for setting contrast level using buttons on the balance's overlay

08 Screen saver
Switching on the screen saver causes blanking displayed values after a set amount of time. The indication on the display does not change while blanking.

09 Temperature
This function serves for information purpose only, and it enables previewing temperature value that is measured inside the balance by a sensor. Return to menu by pressing ESC key.

10 Balance no.
This function serves for information purpose only, and it enables previewing factory number of a balance.

11 Software no.
Enables previewing number of software revision operating in a balance.

12 Parameter printout

Enabling this function causes printing balance parameters set in the user menu. The user specifies numbers of parameters that should be printed.

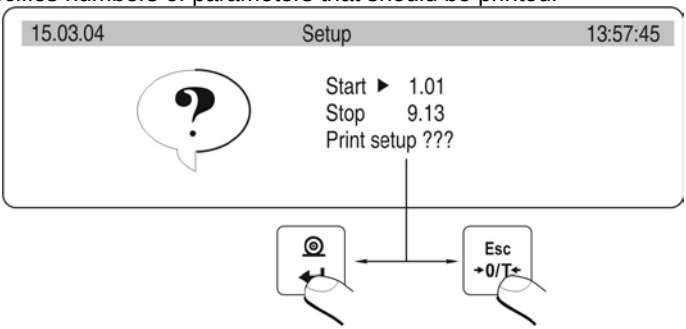


Fig. 28. Submenu Other - parameter printout

On entering this option and selecting user settings, the balance starts sending current parameter values to a connected printer via RS 232 interface.

13 Acquire (upload) parameters

Enabling this function causes uploading all parameters sent via RS 232 interface from a connected computer. On completing uploading process the balance informs a user on number of accepted and changed parameters, and number of incorrectly declared parameters which are rejected by the balance. Printing and uploading balance parameters is a very simple and intuitive means of setting new values of balance parameters. On printing to a file current parameter values on a connected computer, the user can simply and quickly change parameter values. After saving made changes, the updated file is sent from the computer level to balance's software. On completing of uploading process and saving changes the balance accepts new parameter settings. The procedure requires that a user is familiar with balance parameters and has good knowledge of computers.

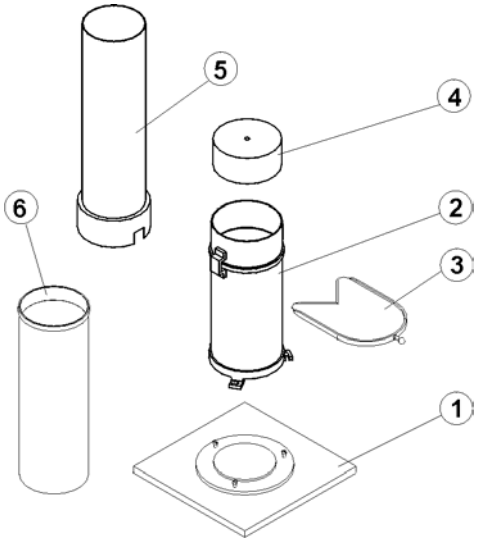
14 Password protection

This submenu enables setting a password limiting access to a balance for an Administrator and a user *(see point 8.1. of this user manual: USER LOG IN)*

18. WORKING MODES

18.1. Density determination of grain in loose state

The balance software has ‘REDUCTION TABLES FOR GRAIN AREOMETERS OF A NEW N EQUATION’. The measurement is carried out using a container of constant volume 1l. When the measuring process is over, the software automatically determines density and the result kg/hl is shown on the balance display.



DENSITY DETERMINATION KIT

1. **Measuring container base**
2. **Measuring container of 1l volume**
3. **Knife**
4. **Ring**
5. **Filler**
6. **Spilling vessel**

Fig. 29. Grain arerometre – the construction

The function activation

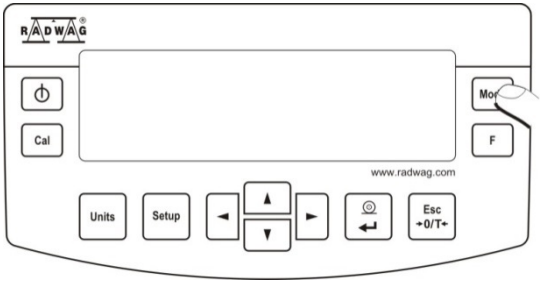


Fig. 30. Density function activation

Press **MODE** key – the balance display will show the balance available functions. Move the marker to the field GRAIN DENSITY using the keys ▲ and ▼. Press ► key.

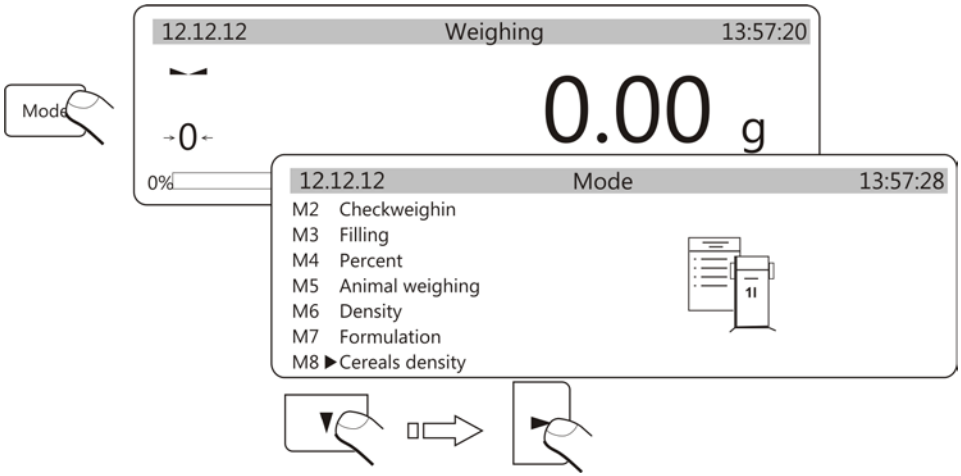


Fig. 31. Density function activation – function selection

The display shows the menu and you should select the grain type and the grain aerometer type. Now statistics and automatic printout options are available.

If you set for them options to YES:

- After weighing the samples their final result will be automatically exported to the printer and the computer,
- The statistical module will be active (statistics is carried out for the subsequent final results of grain density determination)

After the grain and aerometer selection, move the marker to the field Start and press the ► key.

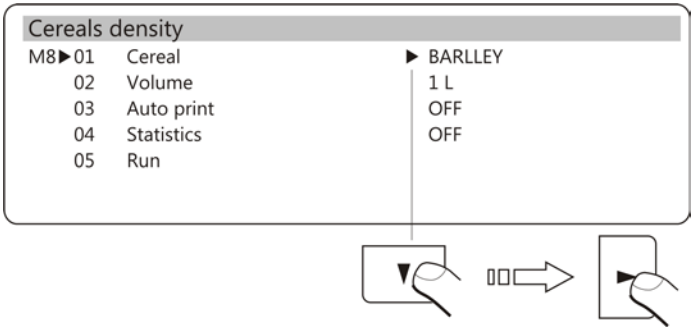


Fig. 32. Grain density – internal settings

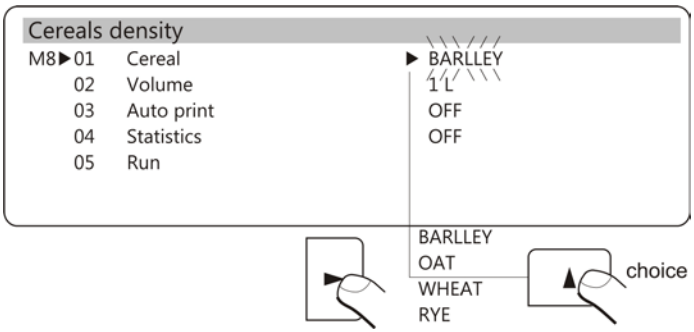


Fig. 33. Grain density – grain type selection

18.1.1. Grain density measurement

The process of loose grain density determination should be carried out in accordance with PN-ISO 7971-3. The balance displays the hints to help the user to carry out the procedure.

1. Sample the grain (according to the norm) and in the closed container level the sample temperature with the test room temperature.
2. Set the appropriate parameters of the function ‘Grain Density.’
3. Enter the function ‘Grain Density’ according to point 16.1.

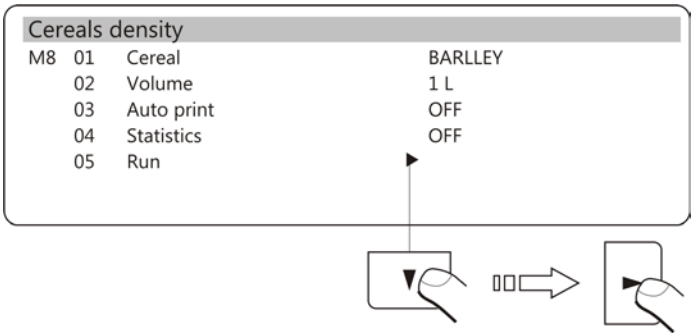
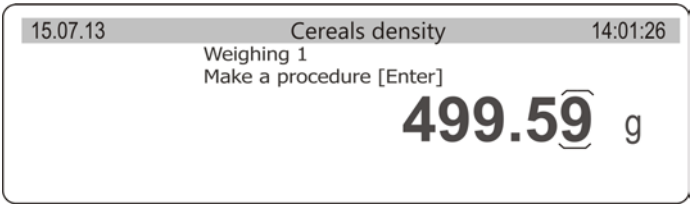


Fig. 34. Grain density – starting the measurement

4. Put the container (**2**) and the ring (**4**) on the weighing pan and tare their mass to the balance memory.
5. Take the container and the ring from the pan, the display will show their weight with a minus sign.
6. Install the container **2** on the base **1**.
7. Slide the knife **3** into the container slit **2**.
8. Put the ring **4** on the knife.
9. Put the filler **5** on the container **2**.
10. Spill the grain to the spilling vessel 6 up to the marking inside the vessel.
11. Spill the grain to the filler **5** (from 3-4 cm above the filler, the grain stream should be smooth directed to the vessel centre, spilling time: approximately 12 seconds for 1l container, approximately 8 seconds for ¼ l container.
12. Draw the knife quickly, holding the container with the other hand.
13. When the ring together with the grain is on the vessel bottom, you need to cut off the excess grain by a complete sliding the knife to the slit (do not shake the container).
14. After taking the container from the base, remove the excess grain over the knife.
15. Remove the filler **5**, clean the knife and draw it out of the slit.
16. Carefully put the container with the grain on the weighing pan

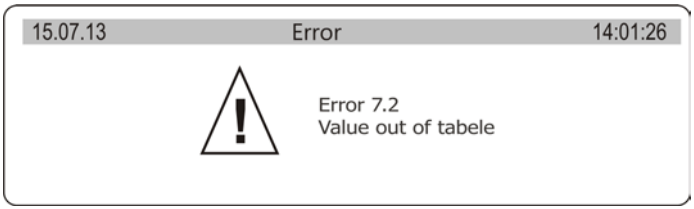
- the grain mass in the container will be displayed – when the result indication is stabilized, press ENTER key.



Rys. 35. Grain density –measurement

17. On the weighment confirmation, the balance software automatically:

- Checks if the weighing result lays within the range of the data (for particular grain) introduced to the data tables. If not, you will see the message:



Rys. 36. Grain density – error

- After the error message the displayed result will equal zero, which means that it is impossible to determine density for this measurement, the procedure must be repeated.
- If the software confirms the weighment correctness, the sample mass is automatically determined and the density result in kg/hl is held on the display, read from the table for the particular mass and selected grain.

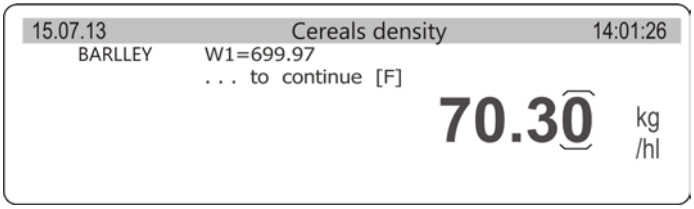


Fig. 37. Successful measurement.

18.1.2. Grain density determination procedure

When the grain density determination process is over, the user can obtain a printout containing particular data concerning the process.
The user can have the a printout automatically on the process completion, if the parametre **02 Print aut.** is set on **YES**.

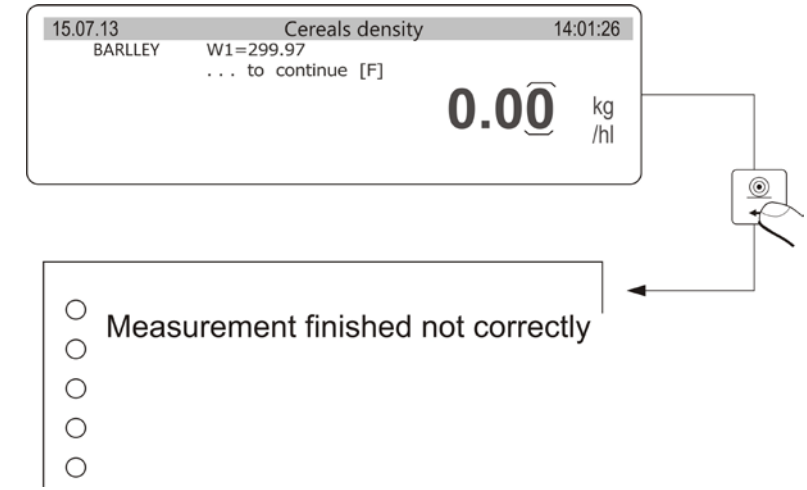


Fig. 38. Printout for an incorrect weighment

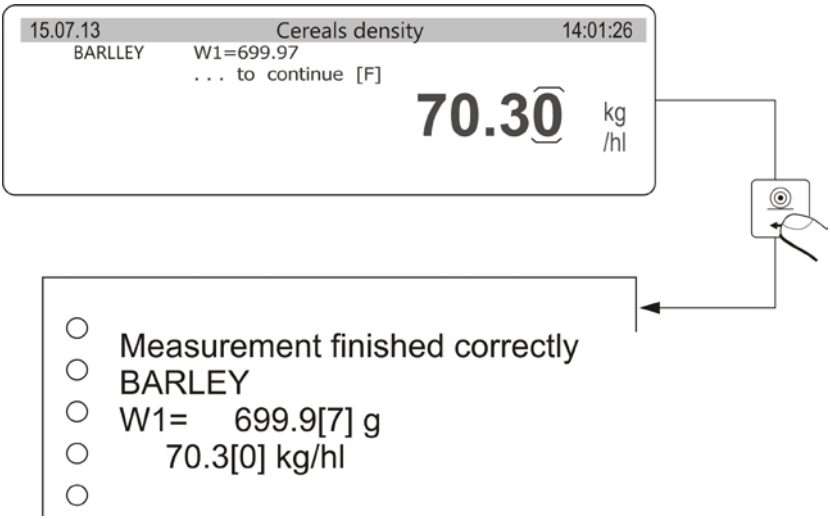


Fig. 39. Printout for a correct weighment

Pressing the PRINT key will print the result of grain density determination procedure. The standard printout can contain all variables from the submenu P2 GLP after setting their values on 1:YES (possibility of settings change in the menu e.g. P2 GLP available only from the level of WEIGHING mode).

Non-standard printouts may contain all the variables like in the standard printout and other texts and data important for the user. Detailed description of non-standard printouts is provided in point 17. of this user manual.

18.2. Parts counting of the same mass

The parts counting mode can be carried out suing three means:

- inserting mass of a single part
- determining mass of a single part from a standard quantity
- selecting a part for counting from balance's database

18.2.1. Counting by inserting mass of a single part

Activate parts counting mode.

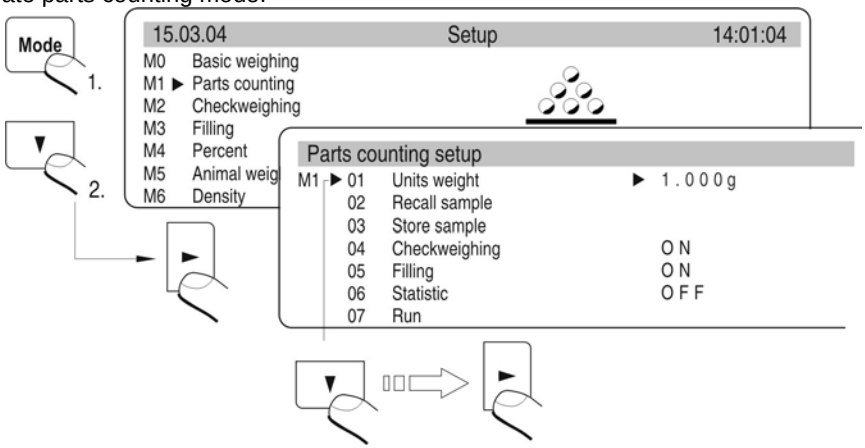


Fig. 40. Parts counting – main menu

Set reference mass and press **ENTER** key or move the cursor next to the field 07 Run and press **RIGHT ARROW KEY**. The display indications change to specific for the parts counting mode.

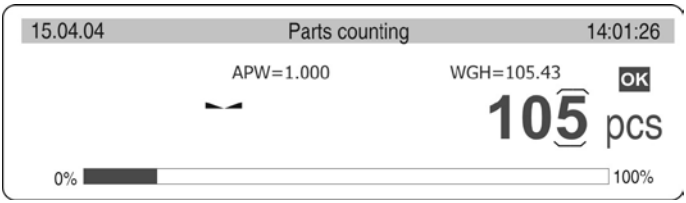


Fig. 41. Parts counting – display content

APW – mass of a single part [g]
WGH – mass of all parts placed on balance's weighing pan
pcs – marker of the parts counting mode

Return to weighing mode

- Press **MODE** key, the display indicates list of available working modes
- move the cursor next to a field: **MO Weighing**
- Press **RIGHT ARROW KEY**, the software returns to weighing mode and displays current measurement result

18.2.2. Counting by determining mass of a single part from a standard quantity

Enable parts counting mode regardless on mass that has to be specified in field 01. Move the cursor next to a field **07 Run** and press **RIGHT ARROW KEY**. While in parts counting mode press **F** key. The display opens a window for specifying standard quantity of counted parts (fields 01 – 04) or set the standard quantity in field 05 – Sample.

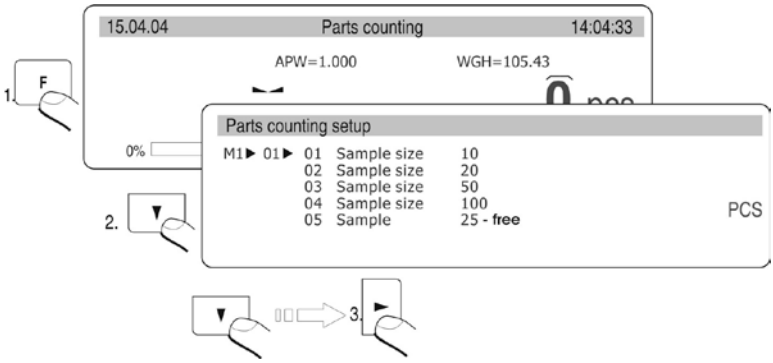


Fig. 42. Counting by determining mass of a single part from a standard quantity

Next, press **RIGHT ARROW KEY** and follow commands presented on the display.

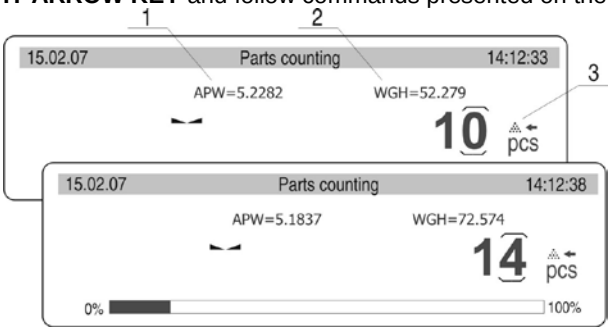


Fig. 43. Display content with enabled AAC function

1- mass of a single part
2 - mass of all counted parts
3 - the pictogram of enabled Automatic Accuracy Correction function

The display indicates mass of counted parts, that are loaded on balance's weighing pan (i.e. 10 parts). If the added amount of parts is below the currently counted one, then the software automatically corrects mass of a single part. In this case it is APW = 5.2282 corrected to 5.1837. from now on the following parts are counted according to the new mass of a single part.
This means enables counting mass of a single part from a standard quantity.

The software comprises four conditions for operation of Automatic Accuracy Correction function

1. After adding the number of parts placed on balance's weighing pan must be greater than before adding
2. After adding the number of parts loaded on balance's weighing pan must be less than twice the quantity which was indicated on the display before adding
3. current quantity of parts must contain within a tolerance ± 0,3 of the total value,
4. stable measurement result.

If a user claims, that standard quantity is sufficient, it is possible to save the mass of a single part in balance's memory by pressing **RIGHT ARROW KEY** on balance's overlay.

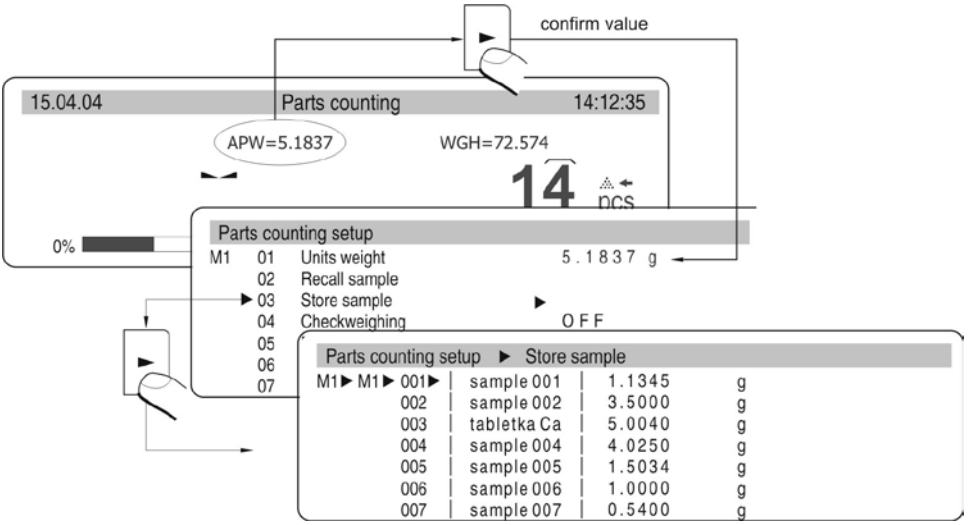


Fig. 44. Automatic Accuracy Correction – saving single part mass in the database

Set the cursor next to a desired field and insert name for weighed parts. Press **Enter** key *(for saving the name)* and **Enter** key (for saving the value*)*. Next to the inserted name there is mass of a single part. Now the record in the database is ready for recalling by using field 02 Recall standard.

18.2.3. Selecting a part for counting from balance's database

Enable parts counting mode in accordance with below figure.

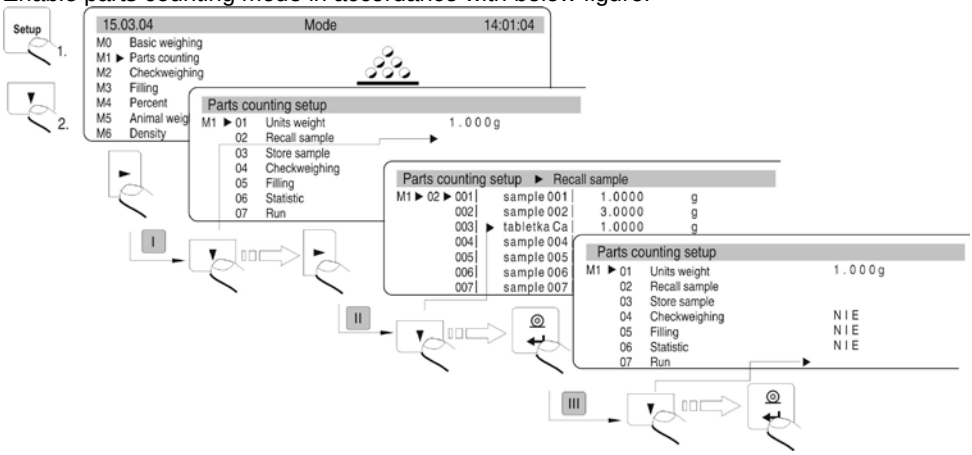


Fig. 45. Selecting a part for counting from the database

Select a record from the database, and start part counting process.

18.3. Checkweighing

Checkweighing is a process intended for precise determining mass of a weighed sample with set and enabled checkweighing thresholds (limits). The thresholds are to visualize (by means of a bargraph located on the left side of the display) and monitor checkweighing process.

Mode activating

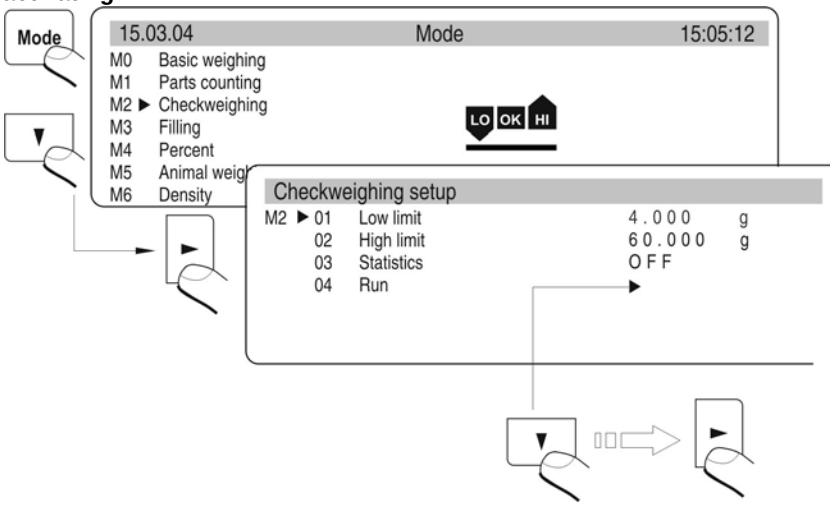


FIg. 46. Checkweighing – mode activating

Display content

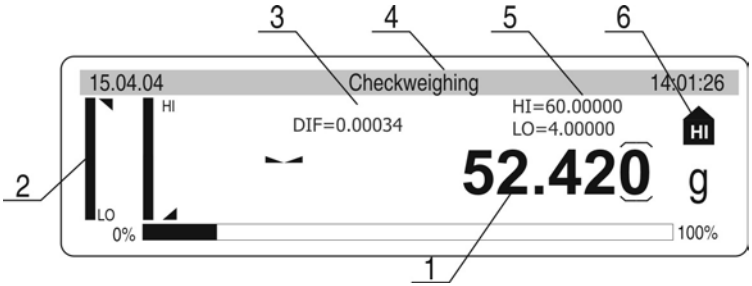


Fig. 47. Checkweighing – display content

1 – measurement result
2 – bargraph
3 – working mode name
4 – difference between mass of weighed sample and the center of the tolerance field (HI/LO)
5 – the values of low (LO) and high (HI) checkweighing thresholds
6 – a pictogram indicating the weighing range of currently weighed sample (available indications: LO, OK and HI).

Remember to set the **02 Hi Threshold** first, as the software automatically checks whether inserted values are correct and hold within the measuring range of a balance.

If set values are recognized by the software as incorrect, the balance displays an error message and returns to parameter settings without saving changes.

Checkweighing with use of database of thresholds (limits)

Checkweighing process can be carried out with use of the DATABASE OF THRESHOLDS, which is a programmable collection of records comprising:

- 500 records
- Name of a product in each record (max 10 alphanumeric characters)
- The value of HI threshold for each record
- The value of LO threshold for each record

Programming the database of thresholds

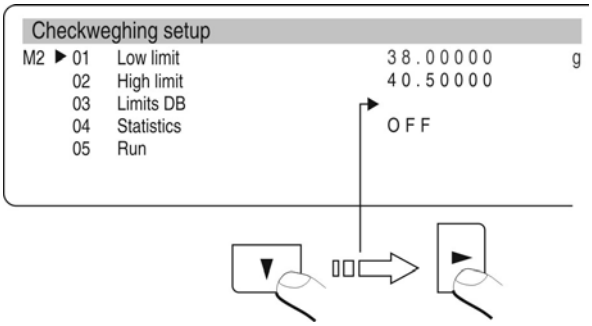


Fig. 48. Checkweighing – submenu content

- Move the cursor to a field "**Database of thresholds (limits)**" and press **RIGHT ARROW KEY**
- Select number of a record by moving the cursor next to a desired field and press **RIGHT ARROW KEY**

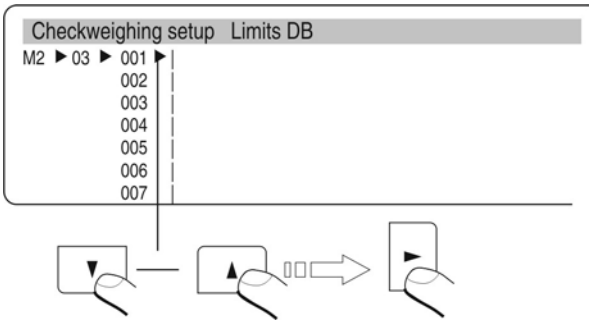


Fig. 49. Checkweighing – programming database of thresholds (limits)

- Move the cursor to a field "**Database of thresholds (limits)**" and press **RIGHT ARROW KEY**

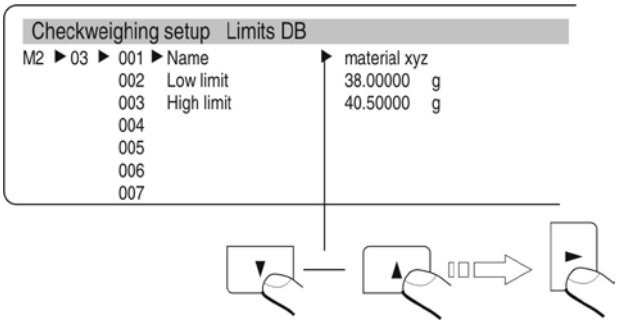


Fig. 50. Checkweighing – programming database of thresholds – inserting thresholds values

- Enter a name for a selected record (name of a product to be weighed)

- Enter the value of HI threshold (limit)
- Enter the value of LO threshold (limit)
- Accept entered values by **double** pressing of **ENTER** key

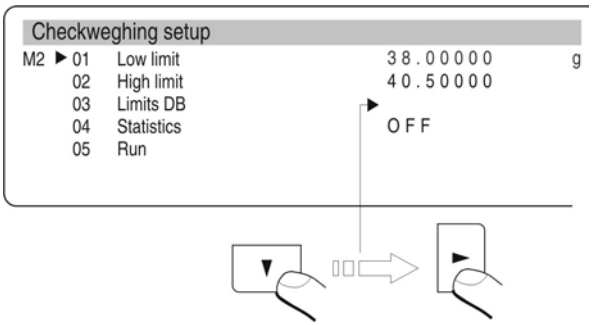


Fig. 51. Checkweighing – mode operation with enabled checkweighing limits

- Move the cursor to a field "**START**" and press **RIGHT ARROW KEY**
- The balance is ready to weigh a product with set checkweighing thresholds (limits)

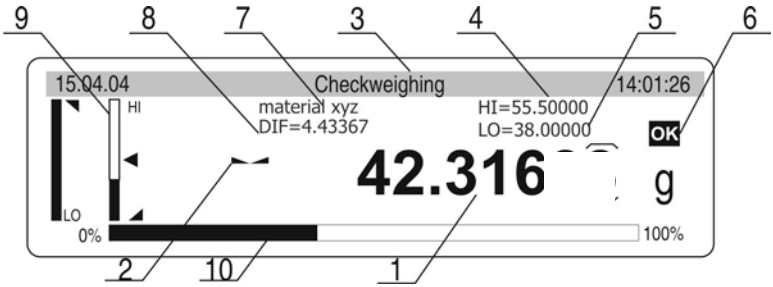


Fig. 52. Checkweighing – display content

1 – measurement result
2 – pictogram of stable measurement result
3 – working mode name
4 – the value of HI threshold (limit)
5 – the value of LO threshold (limit)
6 – a pictogram indicating the weighing range of currently weighed sample (LO – OK – HI)
7 – name of a product saved in the database of thresholds
8 – difference between the measurement result and the center of set tolerance field
9 – a pictogram indicating the current "position" of weighed sample in relation to set checkweighing thresholds (limits)
10 – a bargraph indicating the range of applied measuring range of a balance.

Selecting other product from the database of thresholds (limits)

- While in checkweighing mode press **SETUP** key
- A message box is opened on the display. Go to the database of thresholds (limits) and select another record from the database or set other HI and LO thresholds values if the database is disabled.

18.4. Filling

Filling (dosing) mode is intended for precise measuring or adding a product until reaching a pre-defined target value. Before the beginning of a measuring cycle the user should set a target mass, which is simultaneous the HI dosing threshold.

Mode activating

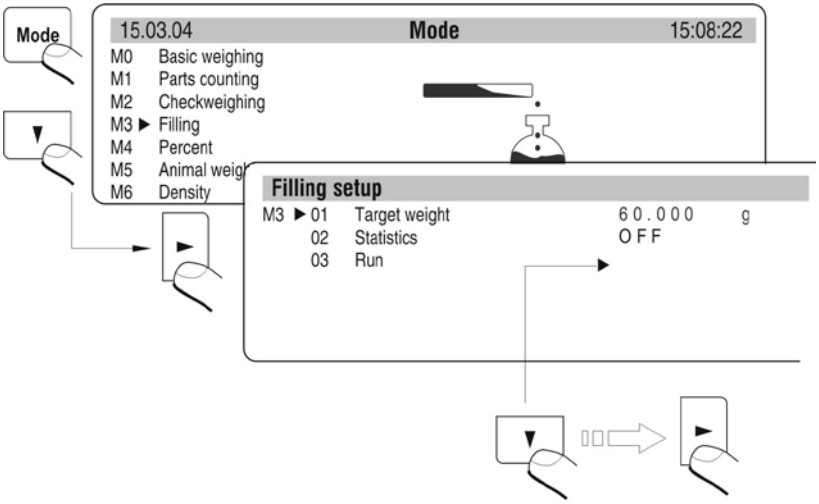


Fig. 53. Filling – mode activating

Display content

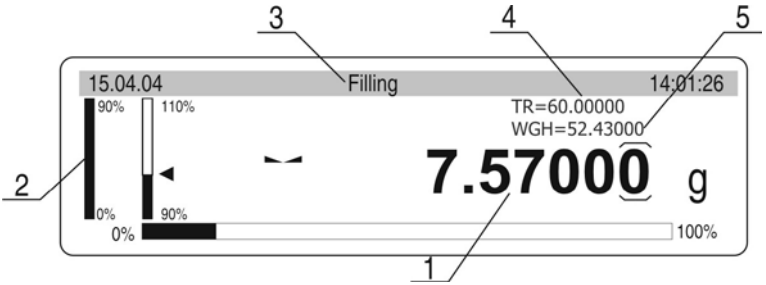


Fig. 54. Filling – display content

1 – mass to be placed on the weighing pan to reach a pre-defined target value
2 – bargraph
3 – working mode name
4 – TR (target) the value of target mass which is declared in mode parameters *(see Fig. 42 M3 01 Target mass)*
5 – WGH mass currently placed on balance's weighing pan

18.5. Percent setup

The purpose of this working mode is comparing mass of a weighed load with reference mass which is specified in mode settings. The result of the comparison process is displayed in percent.
The reference mass can be set in the options of the working mode or determined by weighing (see procedure description at the end of point*. 18.4. of this user manual*).
Working mode **Percent Setup** can cooperate with additional working modes: checkweighing, filling and statistics.

Mode activating

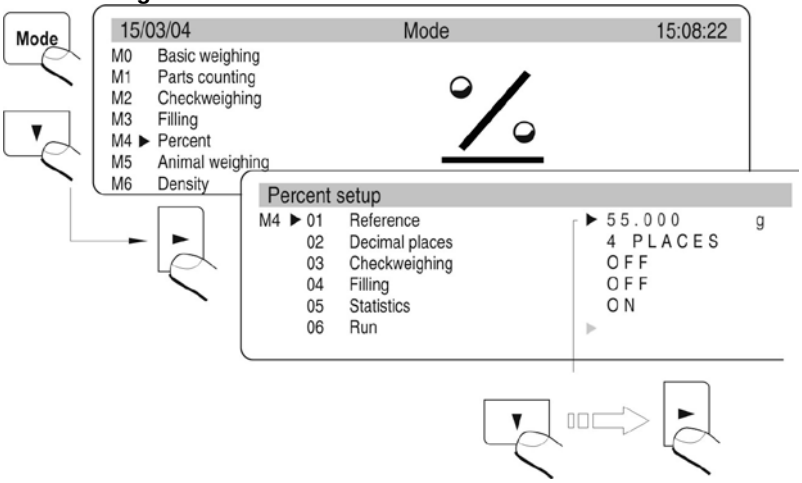


Fig. 55. Percent setup – mode activating

Display content

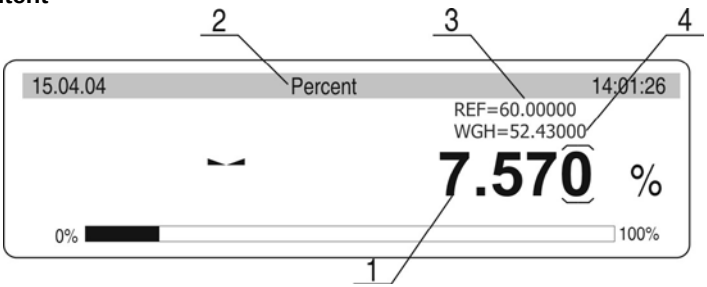


Fig. 56. Percent setup – display content

1 – percent value, i.e. relation between mass of a load placed on balance's weighing pan and reference mass saved in parameter settings
2 – working mode name
3 – REF – reference mass *(see Fig. 44 – M4 01)*
4 – WGH mass currently placed on balance's weighing pan

Percent setup in cooperation with other working modes

While activating the working mode go to its settings and set parameters: M4 03, 04, 05 to YES. Then move the cursor next to START field and start working mode operation.

Caution:

- *On enabling the Checkweighing mode in working mode settings remember to set the HI and LO checkweighing thresholds (limits) as values expressed in %.*
- *On enabling the Filling mode in working mode settings remember to set the target value expressed in %.*
- *On enabling Statistics mode in working mode settings remember to move the cursor to a field:* ***Erase*** *to erase previous statistics, and then move the cursor to a field Statistics and change its attribute from NO to YES. Accept the settings by pressing Enter key*

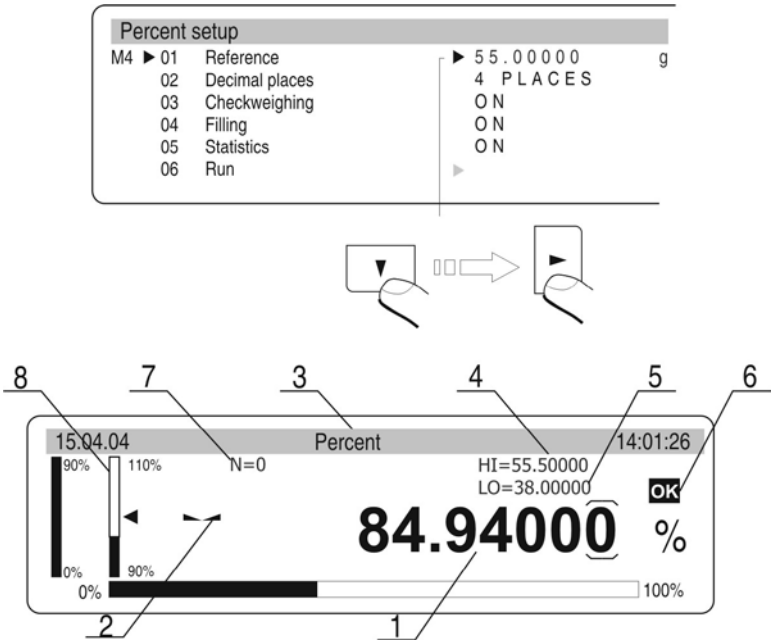


Fig. 57. Percent setup – cooperation with other working modes

1 – percent value, i.e. relation between mass of a load placed on balance's weighing pan and reference mass saved in parameter settings
2 – pictogram of stable measurement result
3 – working mode name
4 – REF reference mass
5 – WGH mass currently placed on balance's weighing pan
6 – a pictogram indicating the weighing range of currently weighed sample (LO – OK – HI)
7 – statistics mode enabled (N=0 – equals to no measurement records in current statistics)
8 – dosing mode enabled (load mass between 90 – 110%)

On completing a measurement series, e.g. 10 measurements (no, of measurement N=10) the user can preview the result of carried out statistics from the measurement series.

- Enter working mode submenu
- Set the cursor next to a parameter 05 Statistics
- Press **F** key to enter the parameter 05 Statistics
- Set the cursor next to a parameter 02 Results
- Enter the parameter to preview results from completed statistics
- Press ENTER key to print statistics result on a connected printer/computer
- Return to working mode submenu and higher menu levels by pressing **ESC** key.

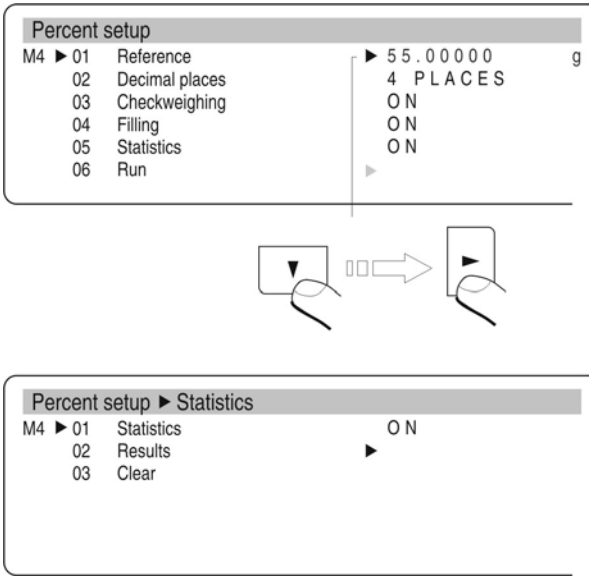


Fig. 58. Percent setup – cooperation with other working modes – Statistics

Determining reference mass by weighing a standard

The percent setup mode enables determining reference mass by weighing an accepted standard.
In such case, when in the main mode window press **F** key. The software initiates the procedure by displaying a command. Follow this and other commands visible on the display.
On completing the procedure the software automatically returns to displaying the main window of the percent setup mode.

18.6. Animal weighing

The working mode applies a selection of filters which are designed to correctly determine mass of an object (animal) moving on balance's weighing pan.

Mode activating

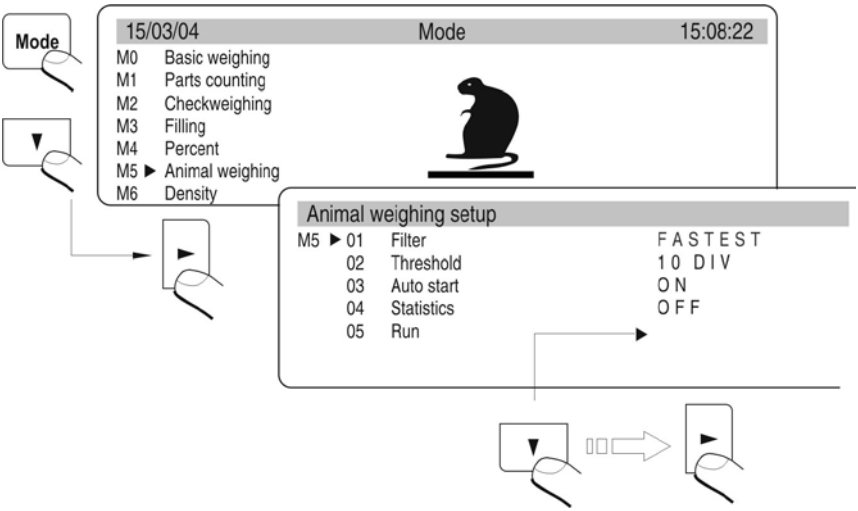


Fig. 59. Animal weighing – display content

Internal mode settings:

- **FILTER** (determines the speed (weighing time) required for stabilization of the final measurement result, the faster the filter setting, the shorter the measurement time.

- **THRESHOLD** (its value is expressed in balance reading units, it is the value below which the weighing results must come down to automatically enable the following measurement of weighed object)

- **AUTO START** (the function used for automatic startup of the following measurement processes)

- **STATISTICS** (calculation of statistics for each weighed object)

- **RUN** (Start measuring process)

18.7. Density determination of solids and liquids

Additional equipment of a balance PS/X series includes a kit dedicated for determining density of solids and liquids.

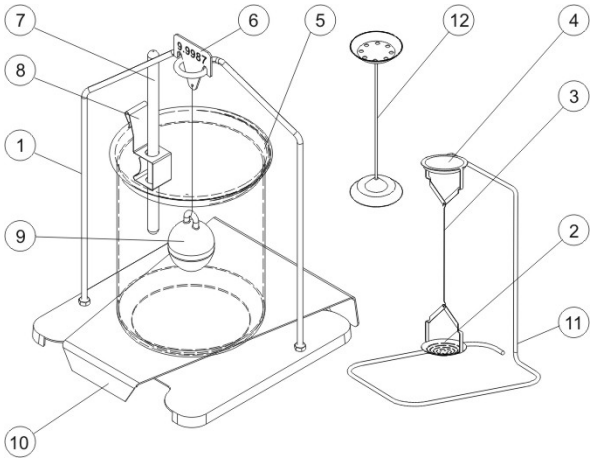


Fig. 60. Components of a density kit for balances with a weighing pan 128x128 mm.

1	Stand (weighing pan with a hanger)	**7**	Thermometer
2	Bottom weighing pan for determining density of solids	**8**	Thermometer handle
3	Flexible connection of the bottom pan	**9**	Sinker
4	Top weighing pan for determining density of solids	**10**	Beaker basis
5	Beaker	**11**	Additional stand for a set of pans or a sinker
6	Hook	**12**	Additional set of pans for determining density of solids, which density is lower than density of water

18.7.1. Density determining of liquids

The basic component needed for determining density of liquids is a glass sinker with precisely determined volume, which value is indicated on sinker's hook.
Before carrying out density determining process enter the sinker's volume value to balance's memory.

The density determining process is based on comparing mass of the sinker, first by weighing it in the air, and second by immersing it in the tested liquid.
The result of liquid density is automatically calculated by the balance software, and indicated on its display.
The measurement result can be sent for multiple times to a connected printer or computer via RS 232 interface and on pressing PRINT key.

18.7.2. Density determining of solids

Density of solids can be determined in one of three types of liquids:

- WATER (distilled water),
- ALCOHOL (spirit 100% +/- 0.1% in reference temperature: 20 °C),
- OTHER (another liquid with known density)

The density determining process is based on comparing mass of a sample, which is first weighed it in the air (i.e. placed on the top weighing pan) and mass of the same sample which is immersed in the liquid (i.e. placed on the bottom weighing pan of the density kit).

Based on obtained measurement results, the software calculates the density of tested sample and indicates on the balance's display. The measurement result can be sent for multiple times to a connected printer or computer via RS 232 interface and on pressing PRINT key

Detailed description of the density determining process is described in the user manual attached to the kit for determining density of solids and liquids.

18.8. Formulation

Formulation mode is intended for preparing mixtures in accordance with pre-defined formulas. It is highly recommended for pharmacies. The software of balance PS/X series features calculation memory, therefore it stores mass of each ingredient of a mixture and sums of weighed ingredients.

While using formulation mode the balance's display shows and continuously updates the following data:

1. Mass of a load placed on balance's weighing pan
2. Name of currently weighed ingredient (max 10 characters)
3. "WGH" Mass to be added while weighing a specific ingredient
4. "IC" Number of ingredients which are already weighed in a prepared mixture
5. "SUM" Sum of ingredients mass which are already weighed in a prepared mixture

Mode activating

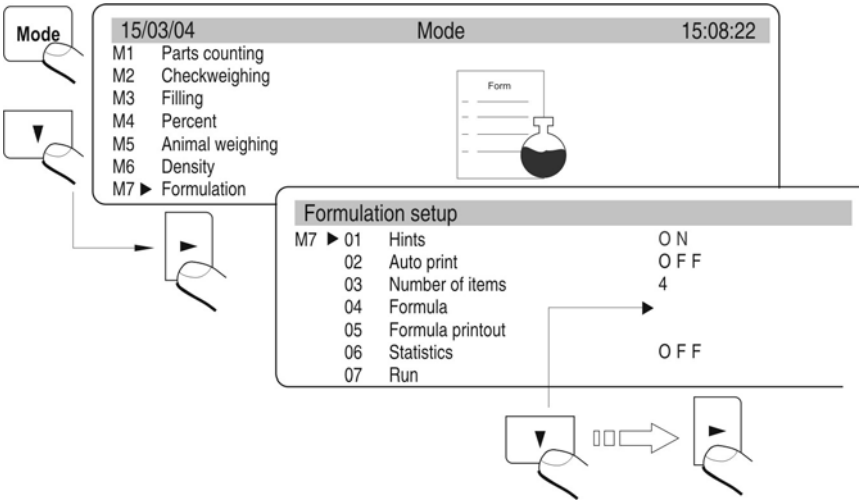


Fig. 61. Formulation – internal mode settings

parameter 01 Prompts (Hints)
on enabling, the balance's graphic display indicates name and mass of each weighed ingredient in a formulation, i.e. data specified in parameter 04 Formulation

parameter 02 Automatic printout
on enabling the parameter, and on confirmation the software automatically sends mass of each weighed ingredient via RS 232 interface to a connected printer or computer

parameter 03 No. of ingredients
here the user can set number of ingredients in a prepared mixture (maximum no. of ingredients: 20)

parameter 04 Formulation
entering this parameter settings opens another submenu for specifying names (max 10 characters) and settings (target mass) for each ingredient in a prepared mixture.

parameter 05 Formulation printout
enabling this function causes printing parameters of an active formulation on a connected printer. The printout contains names and settings of each ingredient in a formulation and total sum of a complete formulation.

parameter 06 Statistics
enabling (YES) or disabling (NO) of statistical calculations.

CAUTION:
The statistical calculations refer only to the total mass of prepared mixture (mass of each ingredient in a formulation is not included in the statistics).

parameter 07 Start
startup of Formula making mode

Display content in formula making mode

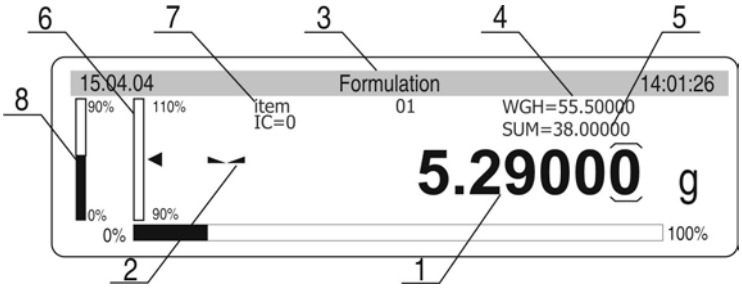


Fig. 62. Formulation – display content

1 – previewing mass currently placed on balance's weighing pan.
2 – pictogram of stable measurement result
3 – working mode name
4 – target mass of the currently weighed ingredient, as specified in the parameter 04 Formulation
5 – Sum of all weighed ingredients of a formulation which are saved in balance's calculating memory
6 – Number of already weighed ingredients in a prepared formulation
7 – name of currently weighed ingredient
8 – bargraphs on the left side of the display, which denote the mass to be added (dosed) to reach pre-defined mass of each weighed ingredient. While reaching the target mass the descriptions on accuracy visible on the bargraph are changing.

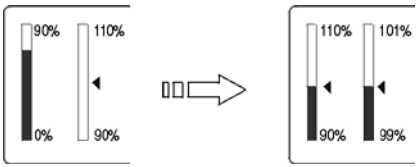


Fig. 63. Bargraphs – automatic scaling

Means of preparing mixtures – in accordance with data set in working mode settings on ingredients and their mass

Go to parameter 04 Formulation and enter names and mass of the ingredients in a formulation. Remember the following conditions:

- Each name can comprise maximum 10 characters,
- Each name has to be accepted by pressing **ENTER** key, and next set ingredient's mass to be weighed in a formula making process

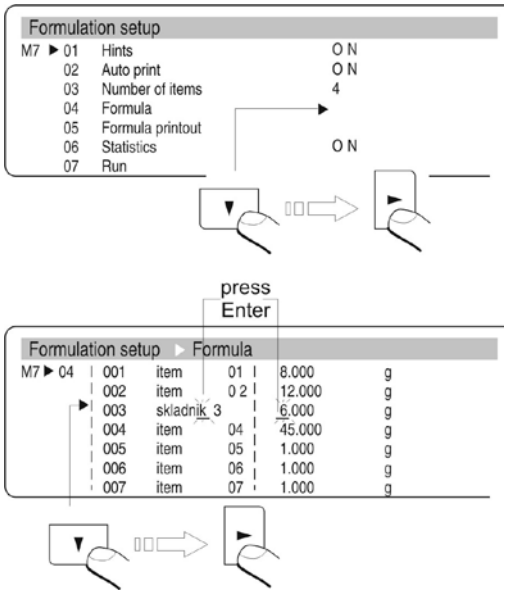


Fig. 64. Declaring a formulation

- Total mass of a prepared formulation and mass of the vessel in which the formulation is prepared must not exceed maximum measuring range (max. capacity) of a balance
- A formulation can contain maximum 20 ingredients
- Parameter 03 No. of ingredients enables specifying number of the ingredients in a prepared formulation
- Remember that maximum number of ingredients in a formulation is 20
- While preparing a formulation the software orders dosing the ingredients in accordance with the their sequence as set in parameter 04 Formulation; e.g. if a

user sets 10 ingredients in parameter 04 Formulation, and then sets no. of ingredients in a formulation to 8, then the software will complete formula making process after weighing the first 8 ingredients.

– The software prepares a list of ingredients in accordance with the sequence set in parameter 04 Formulation, and always starts the formula making process from the first ingredient on the list, and ends the process on an ingredient number as set in parameter 03 No. of ingredients.
– If a user needs a documentation from a formula making process, e.g. in a form of a printout, then set parameter 02 Automatic printout to 1 : YES. In such case each accepted mass of an ingredient (by pressing UNITS key) is automatically printed on a connected printer or computer.

- Set parameter 01 Prompts (Hints) to 1 : YES.
- Enter Formulation mode by pressing ENTER key.
- Tare mass of a vessel for formula making process.
- Weigh the first ingredient of a formulation (ingredient's mass is visible in the WGH field)
- Press UNITS key. Mass of the first ingredient is saved in balance memory. The parameters visible on the display will change to:
  ingredient 2, mass WGH, IC=1, SUM=. . . .
- Mass indication on the display will zero.
- Repeat the process for all the ingredients set in a formulation
- After weighing the last ingredient of a prepared formulation and saving its mass in balance memory (by pressing UNITS key) the display automatically changes to the total mass of prepared formulation. The mass value is also locked on the display, and there are prompts on possible activities.

Means of preparing mixtures without entering data to balance memory on formulation ingredients and their mass

If a user needs a documentation from a formula making process, e.g. in a form of a printout, then set parameter 02 Automatic printout to 1 : YES.
In such case each accepted mass of an ingredient (by pressing UNITS key) is automatically printed on a connected printer or computer.

- Set parameter 01 Prompts (Hints) to 0 : NO.
- Enter Formulation mode by pressing ENTER key
- Tare mass of a vessel for formula making process
- Pour an ingredient no. 1 to the vessel until reaching desired target value (follow criteria on prepared formulation).
- Press UNITS key. Mass of the first ingredient is saved in balance memory. The parameters visible on the display will change to: IC=1, SUM=. . .
- Mass indication on the display will zero.Press UNITS key.
- Repeat the process for all the ingredients set in a formulation
- After weighing the last ingredient of a prepared formulation press **→0/T←** key. The formula making process is completed. The indication with total sum of prepared formulation is locked on the display.
- Press PRINT key to print (send) a report from a completed formulation to a connected printer of computer.

Statistical calculations

Statistical calculations are carried out only on total mass of prepared formulation (mass of each ingredient in a formulation is not included in the statistics*).* If a user wants to run statistics if the formula making mode, then:

1. Go to parameter 06 Statistics
2. Erase results of previous statistical calculations
3. Set parameter 06 Statistics to YES
4. Enter the formula making mode
5. Carry out required series of measurements
6. Once again go to parameter 06 Statistics
7. Enter parameter 06 02 Results
8. In order to print statistics press PRINT key.

18.9. Statistics

Mode activating

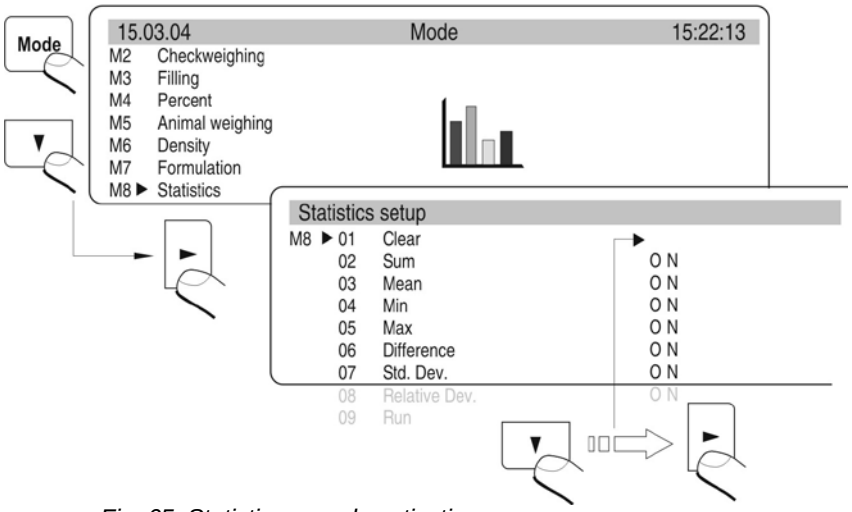


Fig. 65. Statistics – mode activating

The very first process after entering the Statistics mode should be erasing the results of previous statistical calculations. It is carried out by using option **M8 01 Erase**.

All statistical data are updated on an ongoing basis after saving a measurement result in balance memory. Adding another measurement to a series is carried out on placing a weighed load on balance weighing pan, stabilization of measurement result (the measuring unit appears on the display) and pressing **ENTER** key.

The user determines whether statistical data should be visible on the graphic of a balance display while carrying out the measuring process. This parameter is set in statistics mode submenu (the data is visible on setting the parameter to “YES”).

Independently on the settings (YES / NO) on the printout of final result of statistical calculations (enabled by pressing F key) comprises the following data.

N :	*5*	*(number of measurements)*
SUM :	*161.121 g*	*(total mass of all statistical records in a measured series)*
X :	*32.224 g*	*(average mass of all statistical records in a measured series)*
MIN :	*20.486 g*	*(minimum mass)*
MAX :	*35.578 g*	*(maximum mass)*
D :	*15.092 g*	*(difference Max- Min)*
SDV :	*6.581 g*	*(standard deviation)*
RDV :	*20.4 %*	*(variance factor)*

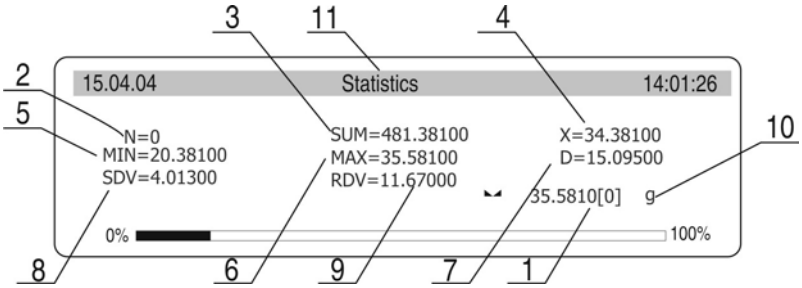


Fig. 66. Statistics – display content including a series of measurements

1. Mass currently placed on the weighing pan
2. Number of measurement in a measuring series
3. Sum of all completed measurements in a series
4. Average mass of all completed measurements in a series
5. Minimum saved mass in a carried out measuring series
6. Maximum saved mass in a carried out measuring series
7. The difference between the minimum and maximum saved mass in a measuring series
8. Precisely calculated standard deviation value
9. Variance factor value
10. Measuring unit [g]
11. Working mode name

Statistics mode features a special option enabling quick calculating of statistics from a measuring series with a possibility of generating reports from the completed calculations. The user can declare the content of a header and footer in a printout of statistical report. The header <PRINTOUT 1>, and the footer <PRINTOUT 2> are settable in non-standard printouts.
In order to correctly use the option, the user has to create templates 1 and 2 using the non-standard printouts (*see point 19.2*). As the templates are ready, the option can be enabled in mode settings.

Means of operation:

- Press key to print the header (PRINTOUT 1)
- Carry out a measuring series (set all options of the GLP menu to NO), and accept each measurement result by pressing <ENTER> key
- On completing a measuring series press F key to print a statistics from the series
- In order to continue the measuring series accept it by pressing <ENTER> key or
- Press key to print a footer (PRINTOUT 2).

For the purpose of increasing the speed of statistical calculations it is possible to enable the option of automatic erasing statistics. The option is set in parameter: P5 (RS 232) 12 <Erase statistics>.

0 - no (the statistics are not erased. Erasing is carried out by entering mode settings and selecting option <ERASE>

1 – on header (the statistics is erased directly on pressing key which precedes printout of a header)

2 – on footer (the statistics is erased directly on pressing key after printing a footer).

19. PRINTOUTS

19.1. Standard printout

A balance PS/X series features 2 basic types of printouts. The first one is a standard printout which comprises of a measurement result and all variables set in the GLP submenu which attribute is set to YES. In case of fields User and Project the user can enter alphanumeric data.

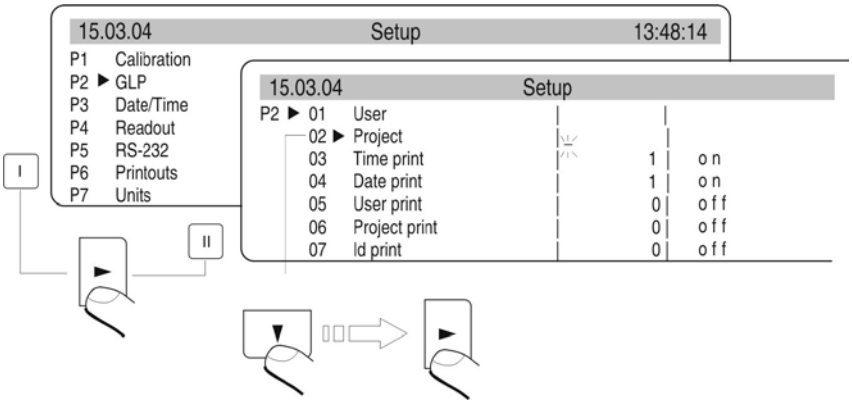
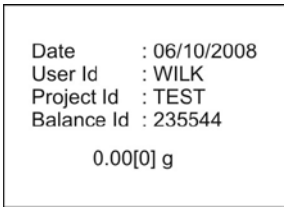


Fig. 67. Declaring variables for a standard printout – submenu GLP

An example of a standard printout:

```
Date          : 06/10/2008
Time          : 12:57:35
User Id       : WILK
Project Id    : TEST
Balance Id    : 235544
Last calibration :
---------------------------------
06/10/2008          12:50
Internal calibration
Diff. :          0.00[0] g
---------------------------------
              0.00[0] g
```

Fig. 68 An example of a standard printout
(all options in the GLP menu are set to YES, i.e. present on a printed)



Rys. 69 Przykład wydruku standardowego

A question mark (?) preceding the mass of a measured load on a printout indicates that the result was unstable.

19.2. Non-standard printouts

Principles of creating non-standard printout templates:

- balance enables creating up to 4 custom printout templates,
- each template must have the string of text start and end specified, e.g. Printout no. 1 Start – 1 and Printout no. 1 Stop – 40. In this case the Printout no. 1 contains text strings from 1 to 40.
- Next insert the texts into the specified text strings, i.e. 1 ÷ 40.
  it is recommended to use an external computer keyboard connected to balance's port. This means of text input is much simpler and quicker.
- Non-standard printout templates may overlap each other, i.e.:
  Printout 1 Start – 1
  Printout 1 Stop – 40
  Printout 2 Start – 20
  Printout 2 Stop – 40

Non-standard printout templates are easily created using printout editing option.

Caution: while text input it is necessary to add all required special signs, such as CRLF, tabulator, etc. When using printout editing option, all of the special signs are selectable from available menu. they are grouped on the one side of ***text editing option****, and included in a printout by adding them to the field* ***Printout.***

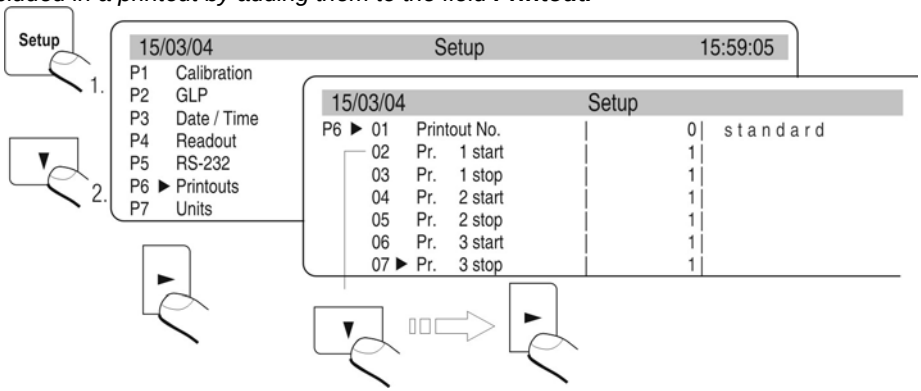

Setup
1.
2.
15/03/04 Setup 15:59:05
P1 Calibration
P2 GLP
P3 Date / Time
P4 Readout
P5 RS-232
P6 ▶ Printouts
P7 Units
15/03/04 Setup
P6 ▶ 01 Printout No. | 0 | standard
02 Pr. 1 start | 1 |
03 Pr. 1 stop | 1 |
04 Pr. 2 start | 1 |
05 Pr. 2 stop | 1 |
06 Pr. 3 start | 1 |
07 ▶ Pr. 3 stop | 1 |

Fig. 70. Menu Printouts – mode activating

A non-standard printout can contain:

- Variables dependent on an enabled working mode and other user needs (mass, date, project no.)
- Texts inserted in balance's user menu
- A custom non-standard printout can contain up to 640 characters inserted in 80 text strings, 8 character each. (starting with parameter String 1 to String 80). A balance user can create up to 4 non-standard printout template).

19.2.1. Inserting text into strings

Variables available in all working modes and having the same value

%%	Printout of a single character "%"
%N	Current net mass in basic measuring unit
%d	Current date
%t	Current time
%i	Balance factory no.
%R	Software no.
%P	Project no.
%U	User no.
%F	Name of an active working mode
%C	Date and time of last completed adjustment process
%K	Type of last completed adjustment process
%I	Deviation in last completed adjustment process
%1	Code 1
%2	Code 2
%3	Code 3
%4	Code 4
%5	Code 5
%6	Code 6

Variables dependent on a currently enabled working mode

Variable	Description	Working mode in which the variable is active
%W	Mass of a single part	PARTS COUNTING
%H	HI high threshold	CHECKWEIGHING
%L	LO Low threshold	
%Z	Target mass	DOSING

%B	Reference mass	PERCENT SETUP
%A	Filter	ANIMAL WEIGHING
%b	Threshold (limit)	
%i	Liquid	DENSITY DETERMINATION
%p	Procedure	
%c	Temperature	
%a	Liquid density	
%v	Sinker volume	

Static variables available in all working modes except for weighing (basic mode)

%n	Measurement no.
%x	Average value
%S	Sum
%m	Minimum value
%M	Maximum value
%D	Difference between max and min value
%s	Standard deviation
%r	Variance factor

Variable available in all working modes and accepting a value related to an enabled working mode

%V – Mass in current measuring unit. Variable value is combined with an active working mode, e.g. number of counted parts in Parts Counting mode or deviation from reference mass in % in the Percent Setup mode

Special signs for designing a non-standard printout template

\\	Single “\” sign
\c	CRLF
\r	CR
\n	LF
\t	Tabulator
\s	Skip to the following text ”string”
\0	End of a printout template

Each text string (Text 1 ÷ 89 Text 80) can contain up to 8 characters (letters, digits, special signs, space). Inputting a sentence comprising multiple words and signs requires using a set of neighbouring 8-character text strings. A user can add special signs to include needed variables in a non-standard printout template.

Example no 1:
Maximum mass cannot exceed 11.250 g!

Inputting this sentence requires using 36 characters grouped in the neighbouring text strings. Enter text strings settings and input 8 characters from the above text into each of the text strings until completing the sentence.

Text string no	**Text**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
19 Text 10	M	a	x	i	m	u	m	
20 Text 11	m	a	s	s		c	a	n
21 Text 12	n	o	t		e	x	c	e
22 Text 13	e	d		1	1	.	2	5
23 Text 14	0		g	!				

Example no. 2:
“RADWAG” Balances & Scales
Date:
Hour:
Load mass
*****Signature:.....
<active working mode >

Enter text strings settings and input 8 characters from the above text into each of the text strings until completing the printout.

Text string no	**Text**							
	1	2	3	4	5	6	7	8
25 Text 16	“	R	A	D	W	A	G	“
26 Text 17		B	a	l	a	n	c	e
27 Text 18	s		&		S	c	a	l
28 Text 19	e	s		\	c	D	a	t
29 Text 20	e	:	d	\	c	H	o	U
30 Text 21	r	:	%	t	\	r	\	n
31 Text 22	L	o	a	d		m	a	s
32 Text 23	s	:	%	N	\	c	\	c
33 Text 24	*	*	*	*	*	S	i	g
34 Text 25	n	a	t	u	r	e	:	.
35 Text 26	.	.	.	.	.	.	.	.
36 Text 27	.	\	c	*	*	*	%	F
37 Text 28	*	*	*					

Principles of inserting texts

- **Using keys on balance's overlay**

▲	Toggling upwards through all available characters: digits, letters, and signs by one value.
▼	Toggling downwards through all available characters: digits, letters, and signs by one value.
►	Selecting a character for modification by moving the cursor to the RIGHT (the following pressing of the the right arrow key causes activating a character for modification (character is flickering; if no character is inserted, then repeated pressing of this key causes adding a space in the text)
◄	Selecting a character for modification by moving the cursor to the LEFT (another pressing of the left arrow key causes a erasing a flickering character, and causes flieckering of a character located on the left from the erased one.)
◉↵	Accept an inserted character

- **Using computer keyboard PS/2 type**

Press F2 key to enter main menu of a balance. Press F3 or use navigating arrows to place the cursor next to a group of parameters P6 Printouts and by pressing F2 key enter the submenu group. Then, using the navigating arrows place the cursor next to a desired parameter and press F2 key to activate text inserting procedure. Use keyboard text keys to insert a text into the strings (max 8 characters per one text string) and accept it by pressing Enter key. Repeat the process for the other text strings.

19.2.2. Designing texts using Printout Editing mode

Mode activating

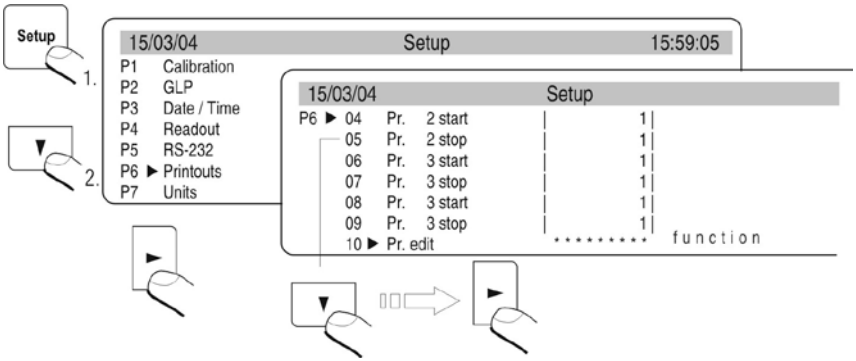
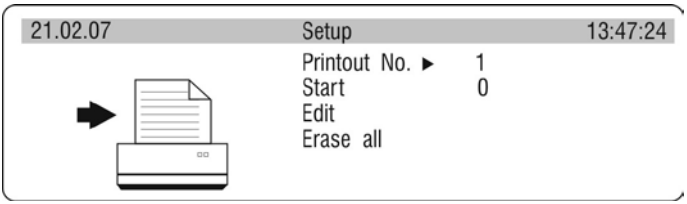


Fig. 71. Non-standard printouts – printout editing



Rys. 72. Non-standard printouts – printout editing

On enabling the printout editing mode select a number of a non-standard printout (1-4) and the place for the beginning of text in a printout (text strings from 1 to 80). Then, go to Edit option to design a printout template. On pressing **RIGHT ARROW KEY**, the software enters printout editing mode.

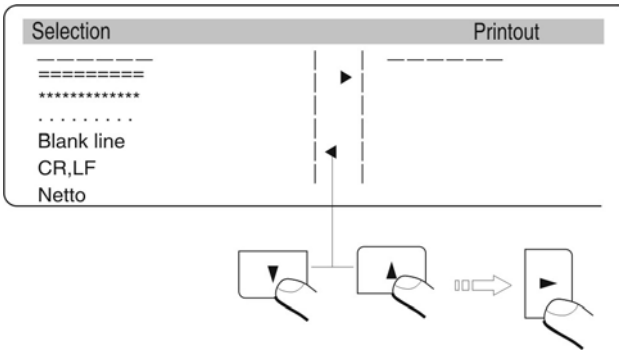


Fig. 73. Printout editing – selecting printout components

Use **navigating arrow keys (up** and **down)** to move the cursor between the following fields. Press **RIGHT ARROW KEY** to add a selected component to a printout template.

On completing editing of a printout template press **ENTER/PRINT** key. The display shows a message asking whether to create a printout template – once again press **ENTER/PRINT** key to confirm.

19.2.3. Activating non-standard printouts

If an active printout template is set to STANDARD, then a printout comprises data on measured mass and variables declared in the GLP menu *(see point 18.1 Standard printout – Fig. 60. Declaring variables for a printout – submenu GLP).*

If a user wants to enable a non-standard printout template (1 to 4), then they need to select a non-standard printout template and specify its beginning and end (the text strings of printout start and stop).

20. COOPERATION WITH A PRINTER OR A COMPUTER

Each pressing of < **PRINT** > key causes sending to a connected printer or computer a signal corresponding to current mass indication (display status) with enabled measuring unit. The default baud rate setting of a balance is 9600 bit/sec. If a peripheral device (a printer or a computer) requires other baud rate settings then it needs to be changed in balance parameter settings.

20.1. Cross-section through connecting cables

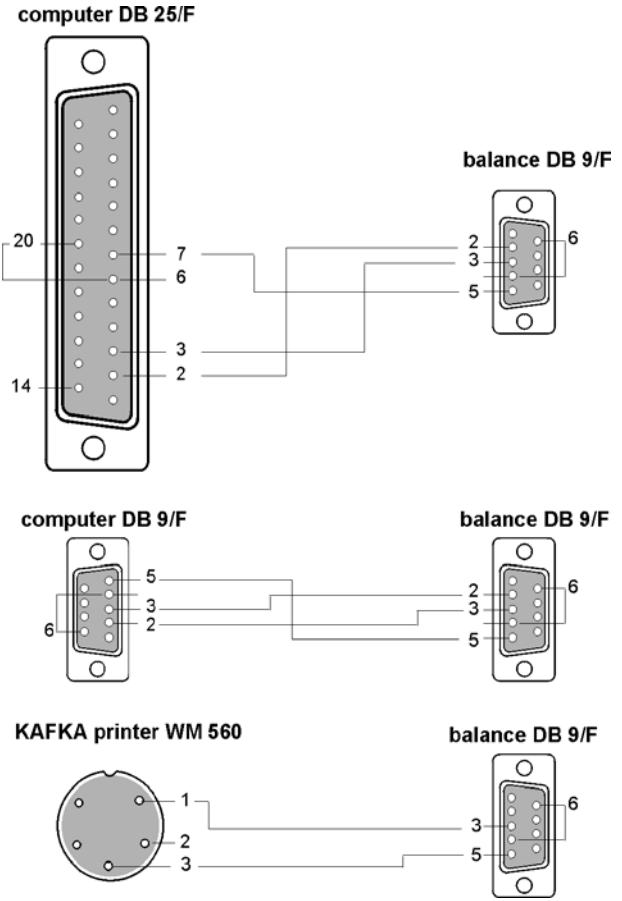


Fig. 74. Connecting cables balance-computer

a balance: slot DB 9/F – a computer slot DB 9/F (with control of data transmission)

Balance	Computer
2 (RxD)	3 (TxD)
3 (TxD)	2 (RxD)
4 (DTR)	6 DSR
5 (GND)	5 (GND)
6 (DSR)	6 (DTR)
7 (RTS)	8 (CTS)
8 (CTS)	7 (RTS)

21. COOPERATION WITH A CITIZEN LABEL PRINTER

Ensuring correct balance cooperation with a label printer requires acting as specified in the following description. Use computer software “ETISOFT LABELS” to design a label template according to user needs:

- Design size of a label
- Design number and type of data to be included in a label

CAUTION:
In order to correctly print variables from a balance on a label printer, the variables should have a required space (number of characters) designed on a label. Number of characters needed for each variable is specified in a below tables: 2, 3 and table 4.

Save a label template on a computer disc and name it using alphanumeric characters. Assign designed label template to memory of a printer CITIZEN CLP-521:

- Set baud rate for RS 232 interface of a label printer to 9600b/s
- An instance of a designed label template named “Label01”

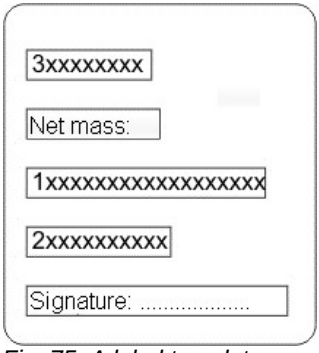


Fig. 75. A label template

Design a non-standard printout in a balance which enables printing a label (i.e. following the data included in the designed label template). Set required printout parameters, e.g.:

- Printout no.
- Text string for start and stop of a selected printout

– After each measurement result the printer should print 3 labels

Principles for designing a printout:

– Insert into text strings data to be included in a printout – group of parameters P6 Printouts; parameters: Text 01 ÷ Text 80.

When designing a printout template use variables for controlling label printout (table 1) and variables for sending specific data from a balance.

TABLE 1

\02L\c	Beginning of a label
r*label name*\c	Give name of alabel
X\c	Srart of variables editing
\02U01*NN*\c	Variable no. 1; *NN – variable symbol*
\02U02*NN*\c	Variable no. 2; *NN – variable symbol*
\02U03*NN*\c	Variable no. 3; *NN – variable symbol*
\02Unn*NN*\c	Variable no. nn. *NN – variable symbol*
\02fnnn\c	Paper offset by nnn value in [mm] – depending on label size
E\c	End of variables of editing
\02Ennnn\c	Print nnnn quantity of labels
\02G\c	End of a label

– An instance of a printout template for a label (following parameters from table no. 1)

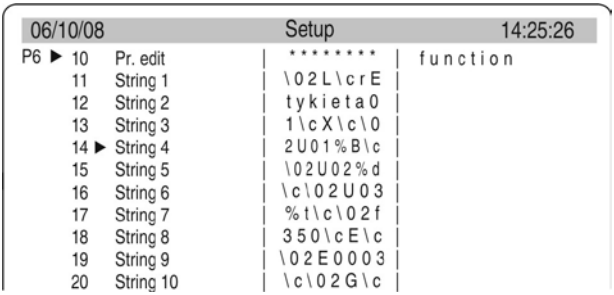

06/10/08
Setup
14:25:26
P6 ▶ 10 Pr. edit | ******** | function
11 String 1 | \02L\crE |
12 String 2 | tykieta0 |
13 String 3 | 1\cX\c\0 |
14 ▶ String 4 | 2U01%B\c |
15 String 5 | \02U02%d |
16 String 6 | \c\02U03 |
17 String 7 | %t\c\02f |
18 String 8 | 350\cE\c |
19 String 9 | \02E0003 |
20 String 10 | \c\02G\c |

Fig. 76. Label template saved in a factory menu

– On adding data on a non-standard printout set other printout parameters, such as:

Printout no. – 1
Printout no. 1 start – 1
Printout no. 1 stop – 10

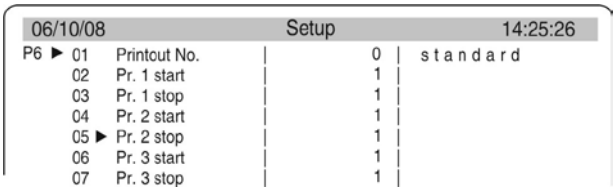

06/10/08
Setup
14:25:26
P6 ▶ 01 Printout No. | 0 | standard
02 Pr. 1 start | 1 |
03 Pr. 1 stop | 1 |
04 Pr. 2 start | 1 |
05 ▶ Pr. 2 stop | 1 |
06 Pr. 3 start | 1 |
07 Pr. 3 stop | 1 |

Fig. 77. Declaring printout content

- On setting printout parameters go back to the weighing mode with procedure of saving carried out changes.

Next, connect a label printer to balance's communication interface using a dedicated cable (see figure on cross-section of a connecting cable given in this user manual). Check transmission parameters of a balance and printer – they should be equal. Place a weighed load on balance's weighing pan and on stabilization of measurement result press PRINT key on balance's overlay. The balance sends data to a connected printer complying with saved template, and the printer prints 3 labels as designed in the software.

Presentation of a label:

Fig. 78. A presentation of a printed label

TABLE 2
Variables independent on enabled working mode

Variable	Number of characters needed for a variable	Variable description
%%	1	Printout of a single character “%”
%N	16 or 18 *	Current net mass in basic measuring unit
%d	10	Current date
%t	8 (for 24-hour version)	Current time
%i	8	Balance factory no.
%R	8	Software no.
%P	8	Project no.
%U	8	User no.
%F	X **	Name of an active working mode
%C	25	Date and time of last completed adjustment process
%K	X **	Type of last completed adjustment process
%I	16 or 18 *	Deviation in last completed adjustment process
%1	6	Code 1
%2	6	Code 2
%3	6	Code 3
%4	6	Code 4
%5	6	Code 5
%6	6	Code 6
%V	16 or 18 *	Mass in current measuring unit. Variable value is combined with an active working mode, e.g. number of counted parts in Parts Counting mode or deviation from reference mass in % in the Percent Setup mode

* depending on settings of a digit marker and printout parameter: to a printer / PC
** depending on the length of a name

TABLE 3
Variables dependent on a currently enabled working mode

Variable	Number of characters	Description	Working mode in which the variable is active
%W	16 or 18 *	Mass of a single part	PARTS COUNTING
%H	16 or 18 *	HI high threshold	CHECKWEIGHING
%L	16 or 18 *	LO Low threshold	
%Z	16 or 18 *	Target mass	DOSING
%B	16 or 18 *	Reference mass	PERCENT SETUP
%A	14	Filter	ANIMAL WEIGHING
%b	14	Threshold (limit)	
%i	14	Liquid	DENSITY DETERMINATION
%p	14	Procedure	
%c	14	Temperature	
%a	16	Liquid density	
%v	16	Sinker volume	

TABLE 4
Static variables available in all working modes except for weighing (basic mode)

Variable	Number of characters	Description
%n	7	Measurement no.
%x	16	Average value
%S	16	Sum
%m	16	Minimum value
%M	16	Maximum value
%D	16	Difference between max and min value
%s	16	Standard deviation
%r	16	Variance factor

* depending on settings of a digit marker and printout parameter: to a printer / PC
** depending on the length of a name

22. COOPERATION WITH EPSON RECEIPT PRINTER

For the purpose of using Polish letters in the printouts it is necessary to:

- On the beginning of a printout that is programmed in a balance add a formula on coding page change to CP 852

Recording scheme:
\1B\74\12\c

- Design a label template using according to user needs and bearing in mind the following relations for use of Polish letters:

	ą	ć	ę	ł	ń	ó	ś	ź	ż
CP 852	\A5	\86	\A9	\88	\E4	\A2	\98	\AB	\BE

	Ą	Ć	Ę	Ł	Ń	Ó	Ś	Ź	Ż
CP 852	\A4	\8F	\A8	\9D	\E3	\E0	\97	\8D	\BD

(instead of using Polish letters insert their code equivalents)

If after completing a printout the paper should be cut, then at the end of a designed printout template add a text:

\1D\56\41\08\C

Cross-section through connecting cable
balance– Citizen printer , balance – Epson printer

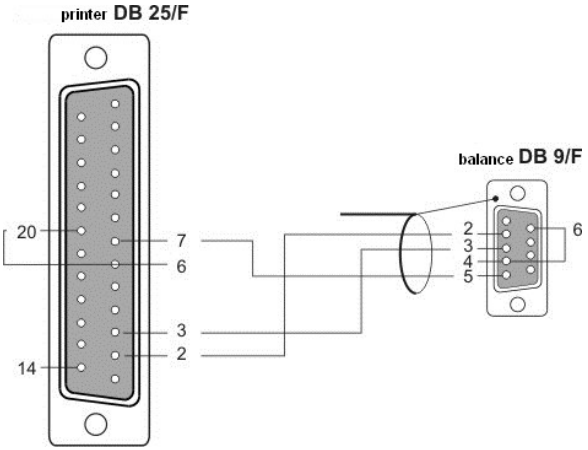


Fig. 89. Cross-section through connecting cable: balance – Epson / Citizen printer

23. UNDER HOOK WEIGHING

A balance PS/X series comes standard with a possibility for weighing loads under the weighing pan. Follow below description for enabling under hook weighing process:

1. Remove plastic hole plug located in the bottom of balance's base,
2. There is suspension place for hook visible in the hole – the suspension is installed permanently to balance mechanism,
3. In the hole install the hook for under hook weighing - the hook does not come standard with a balance),
4. Tare mass of the hook to balance's memory
5. Weigh loads using under hook option.

CAUTION**:**

1. The suspension for hook must not be turned, twisted or manipulated in any direction. Such actions may cause damage to balance mechanism.
2. Mass of all additional elements of the under hook weighing kit, like: a hook, a weighing pan, a string, etc. should be zeroed by pressing **TARE** key.

24. CONNECTING EXTERNAL BUTTONS

A balance PS/X series enables connecting external buttons for tarring or printing measurement results without the need to touch balance's keyboard with operator's hands. The buttons are connected using a dedicated splitter connected to balance's RS 232 interface.

Additionally the splitter enables connecting a printer or a computer.
The splitter and buttons are additional equipment (optional) of a balance PS/X series.

25. LIST OF COMMANDS COMPUTER - BALANCE

Function	INTERFACE RESET
Command	R CR LF (zeroing currently carried out commands, restoring factory default settings)
Function	SEND ALL IMPLEMENTED COMMANDS
Command	PC CR LF (sends information on all commands implemented in the balance's software)
Function	SEND MEASUREMENT RESULT IN BASIC MEASURING UNIT
Command	S CR LF (sends result in basic measuring unit on stabilization of indication)
Function	IMMEDIATELY SEND MEASUREMENT RESULT IN BASIC MEASURING UNIT
Command	SI CR LF

Function	SEND MEASUREMENT RESULT IN CURRENT MEASURING UNIT
Command	SU CR LF sends result in current measuring unit on stabilization of indication)
Function	IMMEDIATELY SEND MEASUREMENT RESULT IN CURRENT MEASURING UNIT
Command	SUI CR LF
Function	ZERO BALANCE
Command	Z CR LF (zeroing of indication on stabilization)
Function	IMMEDIATELY ZERO BALANCE
Command	ZI CR LF
Function	TARE WHEN STABLE
Command	T CR LF
Function	IMMEDIATELY TARE BALANCE
Command	TI CR LF
Function	SWITCH OFF CONTINUOUS TRANSMISSION IN BASIC MEASURING UNIT
Command	C0 CR LF
Function	SWITCH ON CONTINUOUS TRANSMISSION IN BASIC MEASURING UNIT
Command	C1 CR LF
Function	SWITCH OFF CONTINUOUS TRANSMISSION IN CURRENT MEASURING UNIT
Command	CU0 CR LF
Function	SWITCH ON CONTINUOUS TRANSMISSION IN CURRENT MEASURING UNIT
Command	CU1 CR LF
Function	GIVE FACTORY NUMBER
Command	NB CR LF
Function	GIVE MEASURING RANGE
Command	FS CR LF
Function	GIVE SOFTWARE REVISION
Command	RV CR LF
Function	GIVE OR CHANGE DATE IN A BALANCE
Command	PD CR LF (causes sending data on set date or changes the date)
Function	GIVE OR CHANGE TIME IN A BALANCE
Command	PD CR LF (causes sending data on set time or changes the time)

Function GIVE ENABLED WORKING MODE
Command PM CR LF

Function SEND SETUP
Command PS CR LF (causes sending complete data on balance setup – printout of parameters)

Function “BEEP” SOUND
Command B CR LF (causes immediate activating of beep sound in a balance)

Function GIVE LAST CODE ERROR
Command ER CR LF (causes sending code of last saved error in a balance)

Function SEND TEXT STRING
Command DS CR LF (causes previewing a sequence of characters)

Function ERASE TEXT STRING
Command CS CR LF (causes erasing a text string and restoring default display status)

Function SHOW HEADER
Command DH CR LF (causes previewing a sequence of characters in the upper bar of the display)

Function ERASE HEADER
Command CH CR LF (causes erasing a text string from the upper bar of the display)

Function SHOW FOOTER
Command DF CR LF (causes previewing a sequence of characters in the bottom bar of the display)

Function ERASE FOOTER
Command CF CR LF (causes erasing a text string from the bottom bar of the display)

Function CARRY OUT INTERNAL ADJUSTMENT PROCESS
Command CL CR LF

Function LOCK KEYBOARD
Command KL CR LF

Function UNLOCK KEYBOARD
Command KU CR LF

Function SWITCH OFF KEYBOARD “ECHO“
Command E0 CR LF (disables sending codes of pressed keys and buttons)

Function SWITCH ON KEYBOARD ”ECHO“
Command E1 CR LF

Function SWITCH OFF THE BALANCE
Command O0 CR LF (equal to pressing ON/OFF button)

Function SWITCH ON THE BALANCE
Command O1 CR LF (equal to pressing ON/OFF button)

Function DISABLE ZUTOZERO
Command A0 CR LF

Function ENABLE AUTOZERO
Command A1 CR LF

If a non-existing or incorrect command finished with CR LF is sent to a balance, it responses with E S CR LF. Spaces between characters should be omitted, as they are added only for the purpose of proper legibility.

26. ERROR MESSAGES

Message	Error code	Error description
"Control sum error."	**1.1**	Error related to data transmission
" A/D converter error"	**1.2**	Converter error
"Measuring range exceeded"	**2.1**	Maximum capacity (measuring range) of the balance exceeded (over load)
"Measuring range exceeded"	**2.2**	Maximum capacity (measuring range) of the balance exceeded (over load)
"A/D Null"	**2.3**	No divisions from the converter
"A/D Full"	**2.4**	Maximum quantity of divisions from converter exceeded
"Tare/Zero out of range"	**2.5**	Permissible value of zeroing or tarring range exceeded
"Tare out of range"	**2.6**	Permissible value of tarring range exceeded
"Zero out of range"	**2.7**	Permissible value of zeroing range exceeded
"Result > 4% Max"	**2.8**	Too high start mass (balance started with a load on the weighing pan)
"Result > 1% Max"	**2.9**	The difference between mass of a currently measured adjustment weight and mass saved in balance memory is greater than (difference >1%)
"Part < 1 Div"	**2.10**	Mass value of a single part in Parts Counting mode is smaller than balance reading unit
"Part < 10 Div"	**2.11**	Load value placed on the weighing pan while determining mass a single part in Parts Counting mode is smaller than 10 reading units of a balance
"Ref < 1000 Div"	**2.12**	Value of a reference mass in Percent Setup mode in smaller than 1000 reading units
"Out of range"	**3.1**	Parameter value exceeds permissible value
"Incorrect value "	**3.2**	Impermissible parameter value
"DRH - locked"	**3.3**	Parameter change blocked (**DRH** function in the factory menu is enabled)

"Overwriting error "	**4.1**	Errors relating to data transmission to a computer or a printer connected to a balance
"Parity error"	**4.2**	
"Frame error"	**4.3**	
"CTS transmission suspended "	**4.4**	
"XOFF transmission suspended "	**4.5**	
"Incorrect date"	**5.1**	Error of date setting
"Time value exceeded"	**6.1**	Timeout error for carrying out a given process (e.g. zeroing).

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